THE PAPER INDUSTRY

A MONTHLY EDUCATIONAL JOURNAL DECEMBER, 1932

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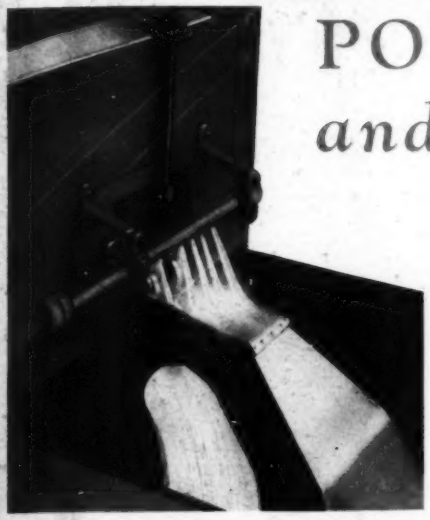

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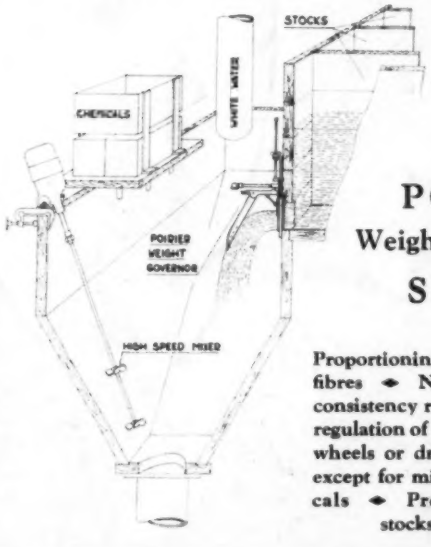

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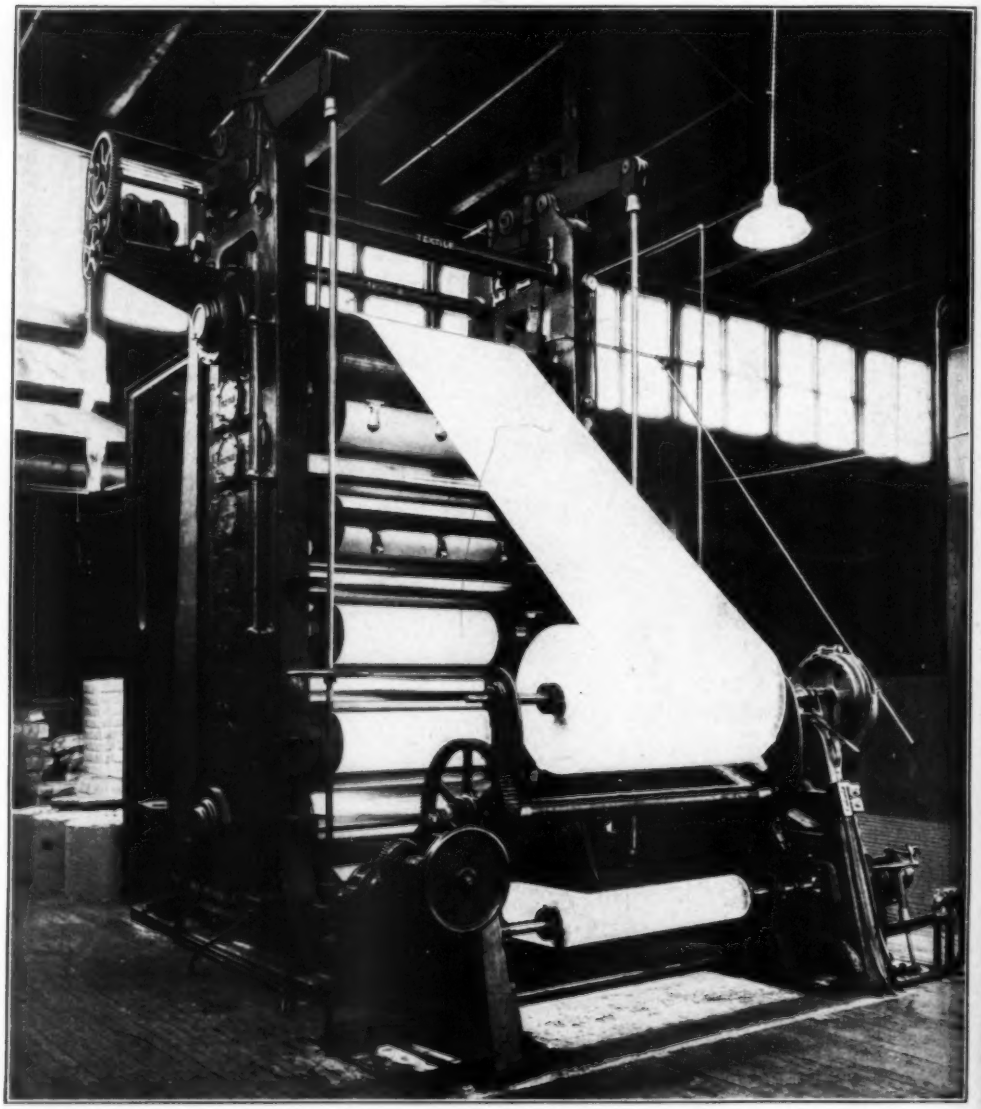

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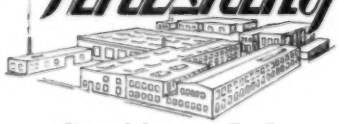

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Used in mills where stock handling conditions are known to be severe, Warren stuff pumps equipped with this type of impeller have given steady, dependable service for more than a year.

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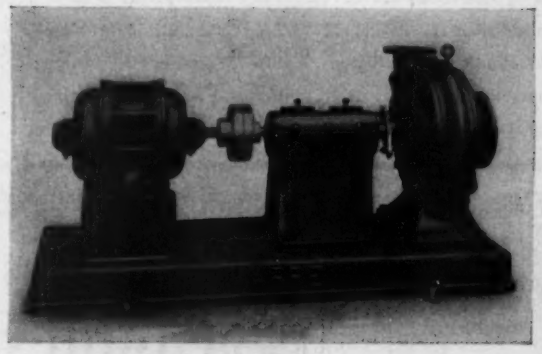

Warren Stuff Pump built to handle 6% clean stock smoothly, efficiently and without clogging or binding.

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WARREN STEAM PUMP CO. *Incorporated*

WARREN, MASSACHUSETTS

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THE PAPER INDUSTRY

DECEMBER, 1932
Vol. XIV—No. 9

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry

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Season's Greetings

At this season of the year our thoughts revert to those whose co-operation, loyalty and friendship in the past have so materially assisted us.

To You All, the Makers of TENAX FELTS extend these greetings:

A Merry Christmas and a Happy and Prosperous New Year

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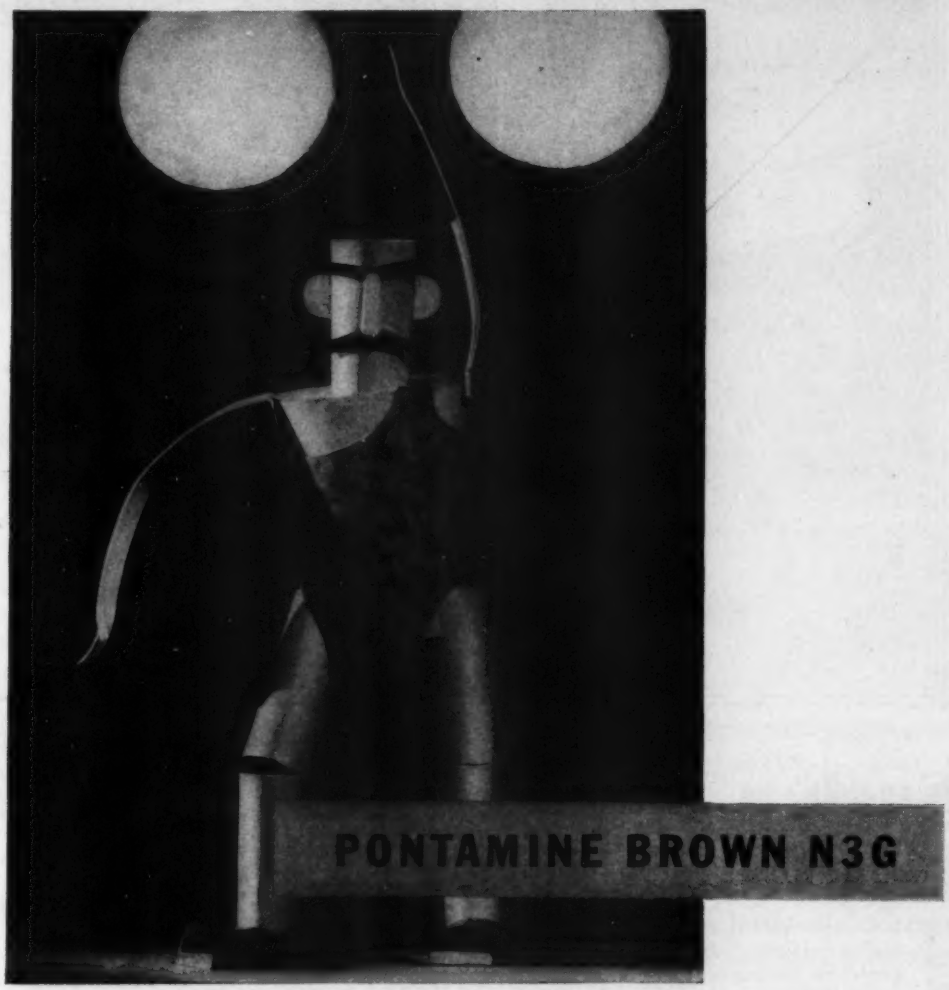

. . . *even if thrown dry in the beater*

PONTAMINE BROWN N3G possesses good fastness to light and is very fast to alkali. In addition it is very soluble and develops full strength even if it is put dry into the beater.

This du Pont Dyestuff is suitable as a base for brown shades on all grades of paper where fastness to light and alkali is important.

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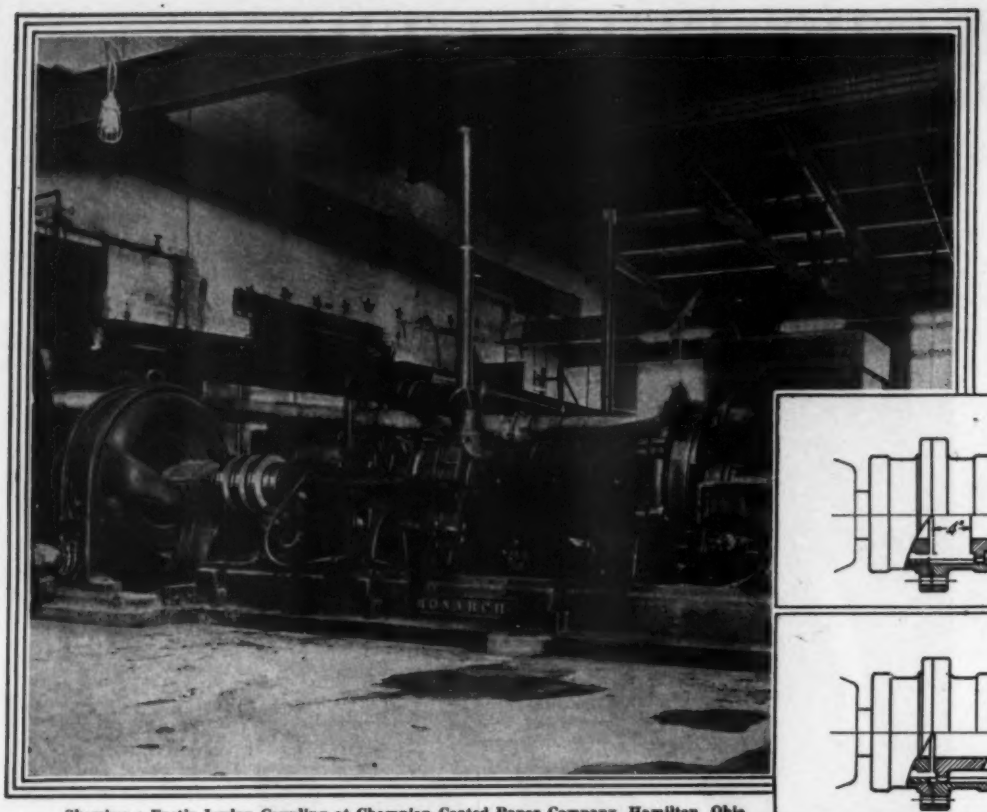
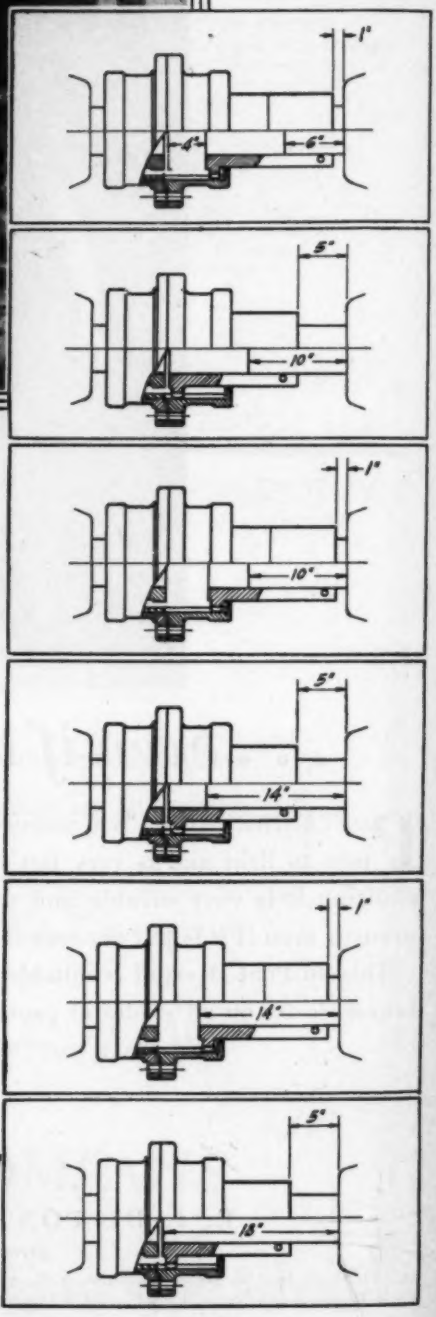


Showing a Fast's Jordan Coupling at Champion Coated Paper Company, Hamilton, Ohio

FAST'S
Self-Aligning
COUPLING



Such a Simple New JORDAN COUPLING

TO START WITH, it has no flexible lacings, bushings, springs or other flexible materials. Instead, a new mechanical principle is used which eliminates the necessity for ever shutting down for coupling repairs.

Note the drawings of a Fast's Coupling on a 5-inch Jordan shaft. Diagram 1 shows the position when Jordan lining is new. In the second diagram the plug has been adjusted four inches.

Now by simply releasing the single pinch-bolt, the hub is moved back four inches, ready for another 4-inch plug adjustment.

This is repeated twice, as shown in the progressive drawings. At the end the plug has been adjusted a full twelve inches, by simply releasing the pinch-bolt and setting the coupling hub back twice.

Do not fail to send for the free pamphlet, "Solving Coupling Problems in Paper Mills." It explains this Jordan coupling in full, as well as other Fast's Couplings for every coupling problem of the pulp and paper industry.

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Please send me the free pamphlet on "Solving Coupling Problems in Paper Mills."

Name.....

Name of Mill.....

Address.....

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G-E Selsyn draw adjuster and G-E enclosed paper-machine speed control panel . . . two important units that help simplify paper-machine operation

UNDOUBTEDLY Joe Brown, your paper-machine tender, would grow slightly red under the collar if called a "cephalopod"—and why not? So why ask him to do the tasks that only a man with as many "hands" as a cephalopod could do efficiently? For example, chasing to the back of the machine to adjust the draw, or changing the draw or speed with push-button stations, and waiting to see how much change he's made. Why not put the motor ammeters on the front of the machine to indicate when the sheet is running heavy on the wire or how much load has been taken from the wet-end felts by the baby press motors or the cylinder mold motors?

With the sensitive control of a General Electric sectional drive at his finger tips, there's no need for your paper-machine tender to be anything but the best paper maker on earth. All the control of "starting," "stopping," "inching," draw, or speed adjustment is provided on the front of the paper machine. The compensated Selsyn speed regulator, a recent G-E development, provides the same close speed regulation at any paper-machine speed.

These are just a few of the many advantageous features of the Selsyn-controlled paper machine. Ask your nearest G-E office to tell you about this advanced paper-machine control. If more convenient, address General Electric Company, Industrial Department, Schenectady, New York.

237-61

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Each step in the manufacturing of Kenwood Felts is checked by means of a thorough and meticulous inspection to make sure that in every way it conforms to certain pre-established standards.

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This is one of the details of careful manufacturing which you enjoy only when you buy Kenwood Felts.

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The application of the device for measurement of tension and pressure on paper maker's felts is covered by patents owned and controlled by F. C. Huyck & Sons.

KENWOOD *tanned* FELTS

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HAVE YOU TRIED

TITANOX-B

IN YOUR COATED STOCKS?

Tests to improve the opacity and finish of "super" and coated stocks indicate clearly that Titanox-B (barium base) gives excellent results. • High index of refraction, remarkable brightness, fine particle size, chemical inertness and high bulking value are characteristics found in Titanox-B. It mixes readily with china clay, blanc fixe and satin white. It disperses well and does not thicken. It assists in the production of a smooth, even coat. • Pure Titanium Oxide (TiO_2) has also been used advantageously in combination with china clay and other fillers. If you are interested in securing whiter stocks that show superior opacity, investigate Titanox pigments. Helpful information gladly furnished on written request.

TITANIUM PIGMENT CO., INC.

Manufacturers of . . . TITANOX-B (Barium Base) TITANOX-C (Calcium Base) • PURE TITANIUM OXIDE

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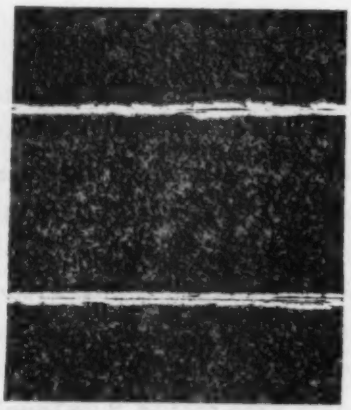
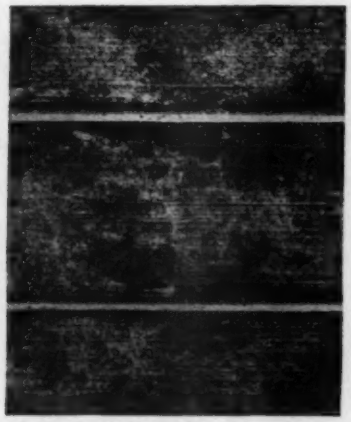
——LOSE SLOT ACCURACY?

——GET DIRTY?

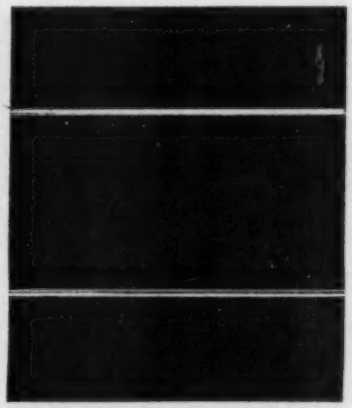
——WEAR QUICKLY?



Ordinary bronze screen plate after 10 months' service (magnified 5 diameters). This plate was recut twice. Note ragged edges, widening of slots and roughness of surface.



Ordinary bronze screen plate after 3 months' service (magnified 5 diameters). Note rounding of slot edges (indicated by darker areas), and widening of slot.



Crodon-plated bronze screen plate after 24 months' service (magnified 5 diameters). Note complete preservation of slot accuracy, absence of wear of slot edges and smoothness of surface.

INSURE THEIR USEFUL LIFE · · · · · ·

USE CRODON

The trade-mark CRODON assures the best in chromium plate.

Write for further information.

Chromium Corporation of America

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Milwaukee Plant
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MILWAUKEE, WIS.

Business Will Expand

WELL, the election is over.

The country gave an overwhelming mandate to the Democratic Party to take possession of the political power in this country and use it for the purpose of bringing prosperity back to the citizens of the United States.

The election occurred three weeks ago. At the time of the election, the thermometer of the general volume of business stood between fifty-three and fifty-four per cent of normal. Last week, the thermometer registered between fifty and fifty-one per cent of normal, a decline of three per cent in general volume.

This would indicate that there was some merit to the pre-election claim that if there were a change in administration, the period between election day and March 4, next, would be one of uncertainty, and business would not expand to any great degree.

We express only a partial belief in that prognosis. We must admit that while there is a further contraction in the volume of general business and it is somewhat more than seasonal, yet, over against that lies the fact that during the past year this country has worked itself into the strongest financial position of any country in the world. Our foreign trade has held up remarkably well; our gold reserves have been built up to gratifying proportions; our credit structure is unimpaired and growing stronger; our deflation of commodity prices has been accomplished within a possible one per cent; and taking the country as a whole, there has been—and will continue to be—a gradual expansion in employment and replenishment of exhausted goods in all divisions of industry.

However, there is another very compelling situation that must not be overlooked, and that is the exhaustion of all reserve stocks in every known commercial, industrial and raw material reservoir. Every man, woman and child in this country, up to January next, will have curtailed their supplies and purchases to the most abnormal extent ever witnessed in this country. The ultimate consumers of industrial and manufactured products are literally without supplies. They must replenish them.

As always has been the case in times past when the people of the United States all curtailed at the same time, they have always come back and bought heavily at the same time.

What is going to happen when the one hundred and twenty-six million people, who have been staying out of the market to a continued greater degree for the past two or three years, all turn at the same time and demand the goods necessary to their sustenance?

There are no manufactured commodities to supply those demands. The retailers have no stocks; the wholesalers have no stocks; the converters have no stocks. And, in addition to that, over fifty per cent of the ordinary producing agencies are closed down. The balance of the production units are limping along at not over fifty per cent capacity.

Now that is bad enough, but the curtailment of demand for goods on the part of the consumer has extended on down to the producers of raw materials.

In the paper industry, the mills have run only as long as their inventories of raw materials permitted. They have bought no supplies of wood and contemplate buying none this year. They have no supplies of chemicals, machine clothing and all the host of necessary materials and supplies that go to make up finished paper.

Should the consumers of commodities, including

paper, address their attention to the job of replenishing their abnormally depleted supplies only to the extent of fifteen to twenty per cent increase in volume, there would occur such a change in the industrial picture as we have not witnessed since 1920.

In brief, that is the situation as we see it here in the paper industry. Business is bound to improve. It never has, it never can and it never will continue in one direction always. We have seen these upturns last for several years. We have seen the depression last for three and one-half years. The time is here and now that the upward turn should begin. We believe that it is in the making now, and that a discernible expansion of buying will take place and become universally apparent before the first of March.

What Is Christmas?

JUST what is Christmas to most of us, and what does it mean? Some of us rush around in a frenzy of excitement for weeks beforehand, planning, shopping, worrying over this and that. Trivial things, such as the selection of gifts and plans for a big dinner that leave us weary in body and soul. Small wonder some are glad when it's over.

Are we not getting far away from the real idea of Christmas? On that day we celebrate the birth of the humblest, yet the greatest; the poorest yet the richest; the most unselfish yet most revered man of all time. He brought to the world enlightenment; an understanding which has unfolded to mankind with the passing of the centuries; his precepts and teachings are known to all nations; and one of his greatest commands is that we love one another.

Never has there been a Christmas when it seemed the spirit of the Christ might be so fittingly exemplified. Never has there been such opportunity to share with others that which we have.

The week of December 11 has been set aside as International Golden Rule Week. The thought behind this movement is to share that which we have during that week and through the Christmas holidays with some one less fortunate than ourselves. Everyone has less this year, but there is always something that may be shared. And then, too, we do not need such a large share of material things to enjoy the real spirit of Christmas.

Helping others to regain some of the necessities and joys of life, giving out a spirit of real friendliness, and the enjoyment of simple pleasures would bring us all back to the spirit of Christmas in its true meaning and such happiness as we did not experience in the more prosperous days when bountiful feasts and costly gifts were the principal factors in our holiday festivities.

We have had some lean years, yes; but we still live in a beautiful world which is ours to enjoy.

Here and there some of the large and representative paper mills; yes, even some of those smaller ones that still keep step in the procession of the industry, report that they are making no money, some operating at a loss, but they have endeavored to keep their plants in operation to give employment to as many men as possible. May it not, then, be said that the management of such mills have tried to keep the real spirit of Christmas alive in the homes of their employees throughout the year? Families have been kept together and homes preserved where this year thankful hearts will sing Christmas carols.

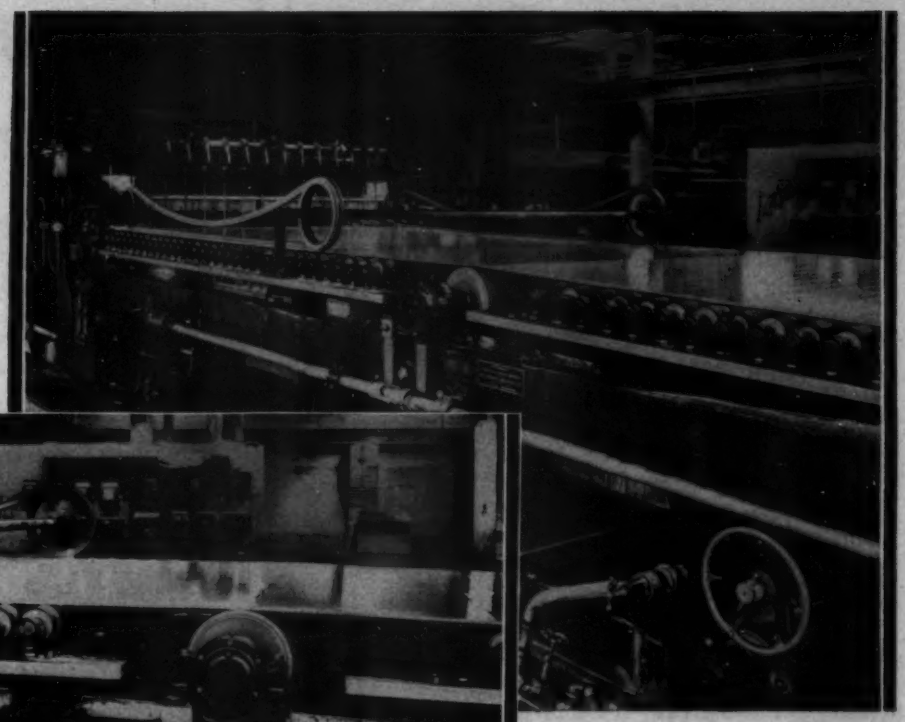
The publisher and staff of this magazine extend to all sincere greetings for a very Merry Christmas. May all hearts be gladdened, and the New Year bring hope, courage and happiness.

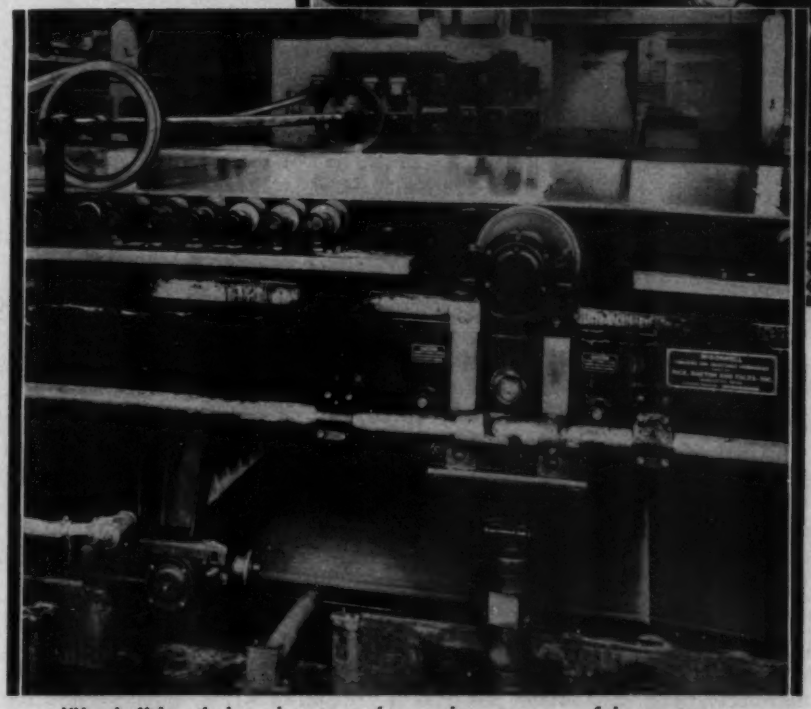
Price Buying

IT IS our belief that price alone never makes a bargain. Good bargains are few and far between. Naturally it is the good purchasing agent who attempts to buy quality merchandise at a low figure and yet the lowest figure must be commensurate with the service rendered. No firm can continue to take business at a loss, as is sometimes inferred in quoting bargain prices, and stay in business for long. Business must make a profit. Without profit a firm soon ceases to function. Any purchaser, who after all also has something to sell whether only in the way of his own services or the products of the company he represents, knows that the bargain seller seldom stands ready to make his products good should they fail in service. They have been bought at a price and in the end the purchaser often finds that he has paid well for them.

Neither should it be inferred that price alone is an indication of true value. Raw materials in nearly all fields of industry are selling for less today than they have for some years past. Overhead in some well-equipped and well-operated plants is low. Such a situation allows production costs to be kept at a minimum and if sales are sufficient to support the shop and can be obtained without too great expense, prices that allow for a fair profit and yet low in comparison to lesser efficient competition can really be made. Profit by obtaining bargain prices in making purchases but be sure that quality and service are such as are desired.

A Dream Come True





The McDonnell Fourdrinier

(PATENTED)

We shall be glad to show you this machine in successful operation.

500 shakes or more per minute and a better shake motion.
A shake which grips and moves effectually the center of the wire.
A genuine revolution in paper making.
Simplicity — not complexity.
Maintenance cost less — not more.
Complete flexibility while running.

RICE, BARTON & FALES

INCORPORATED

WORCESTER, MASSACHUSETTS, U. S. A.

Paper Making Machinery Since 1837

Nineteen Thirty-Three

By WILLIAM SIBLEY

AN ERA of sounder, longer-lasting prosperity will definitely take foothold during 1933. Conditions are not, and haven't been, as bad as they might be, but they are as bad as they are going to be. Deflation extended over a period of forty months has brought the American people back to earth, dissipated the chimerical dreams born of extravagant thinking, revitalized business to the point where common sense more completely prevails.

One of the things that has helped so pronouncedly in this victorious retreat from our industrial fantasmagoria is that of knowing the facts concerning previous periods of similar distress. Our records are more complete than ever before with the result that we can see ahead more clearly.

For instance, we know conditions are never bettered but always confounded by currency inflation; that such action invariably leads the country toward the path of revolution. We know that without exception every plan to soak the rich unfailingly defeats itself by becoming a boomerang against the poor—the very folks the action was intended to help. We can easily draw a lesson from a comparison between the banking structure of 1930-31 and the insurance structure of 1897, and know that drastic changes must be effected in our whole financial system before lasting prosperity can be secured, and that the advent of such changes would be as beneficial to our banking system as our insurance revision of 1897-8 has proved itself to be during the recent crisis.

Gradually, the truths are dawning upon us that the interest of no one group can permanently prosper at the expense of others; that no one nation can progress while the rest of the world remains in the slough of despond. More and more are we realizing that the reckless audacity of a boom period has only one equal and that is the cowardice of a depression; that world stability can be achieved only by a sane solution to the debt problem; that faith in get-rich-quick schemes whether it be farm lands or stock market, seldom leads to anything but chaotic ruin.

The majority of us have learned that American industries rise and fall together; that the weakness of a single industry affects the whole; that first of all both private and public budgets *must* be balanced; that purchasing power can be restored only after both commodities and services are again revalued to a proper relation to each other on a non-speculative basis; that public wants will be satisfied only as soon as we eliminate the confusion of price relationships.

. . . Nor in any measure am I overlooking the grave issues which face the nation with the New Year. We have problems before us which are staggering in their magnitude, appalling in their import.

Facing the short session of the "lame-duck" Congress there is the problem of War Debts, upon the adjustment of which rests world stability, and maychance, American credit. A second problem for this legislative body is the Balancing of the Budget—the neat little chore of discovering where nearly three billions of dollars of revenue can be had. Prohibition is a third problem, which is the gentle job of satisfying a three-way public (drys, moists and wets). Yet another problem is that of Farm Relief, a measure which might well be termed the Unveiling of Roosevelt, since no one yet knows what the President-Elect's plan looks like; not to speak of the Appropriation Bills, the passage of which must be completed if our Government is to have operating funds.

Facing the industrialist, there is the necessity of further Wage Scale Adjustment, which in all cases is most certainly *not* downward; rehabilitation, through a systematic approach to which both productive equipment and current unemployment would be markedly improved; and renewed faith in the value of consistent selling effort.

Space does not permit more than a mere cataloging of the problems facing both government and private enterprise. In the preceding paragraph, for instance, there is mentioned the item of Rehabilitation. There, of itself, is a subject which justifies elaborate discussion, and far more serious consideration by manufacturers than is being evidenced by many. A capital presentation of this subject was written under the title of "A Call to Arms," published in the last issue of THE PAPER INDUSTRY, page 592.

In more than a few instances, advertising appropriations and sales budgets have been reduced to a point considerably below the fall of business. By this I mean that if business in some particular case is 50 per cent of 1928, then in that particular instance, the advertising appropriations and sales budgets have been reduced *more* than 50 per cent. Such a condition obtains in entirely too great a percentage of cases, and until a better adjustment is made between volume of sales and exploitation, little improvement may be expected from those firms.

Nineteen thirty-three is fraught with grave issues for all. However, after counting the factual truths which have been driven home to the majority of us during the past three years, there is every indication that during the coming year this country will relaunch its good ship "Prosperity," repaired and reconditioned.

Approved!
By American Coating and Paper Mills
AN AMERICAN COATING CLAY
American Made for American Trade
H·T· BRAND
COATING CLAY
HIGHEST GRADE FILLING CLAY
The Clay of Uniformity
SUPERIOR advantages: Higher Finish (due to fineness of individual particles ... glarimeter shows on equal calendering four to six points advantage over imported coating clays) »» Requires less adhesives»» Gives greater uniformity of texture »» Purest and cleanest clay produced »» Low moisture content »» Better covering qualities, resulting in superior printability »» Greater opacity.
• Edgar Clays are the result of 50 years' experience in washing clay.
Samples and information mailed on request.
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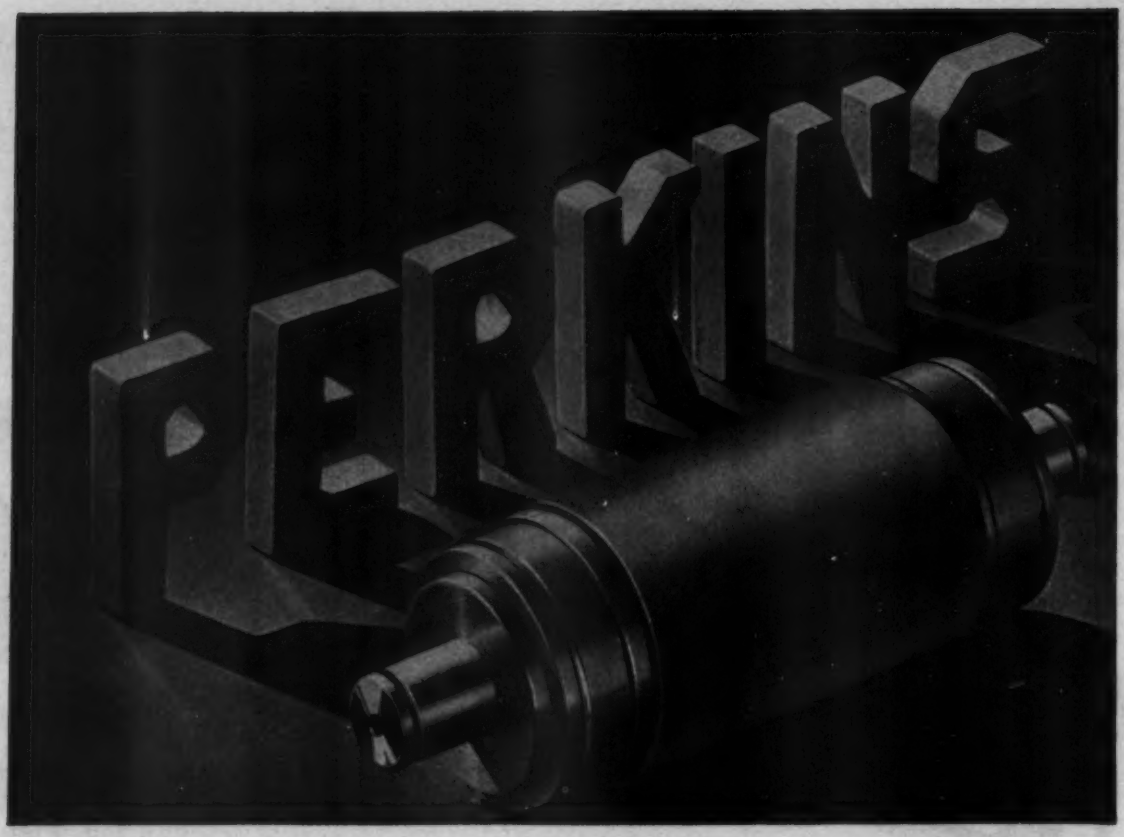

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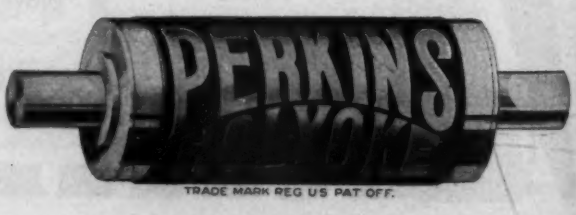

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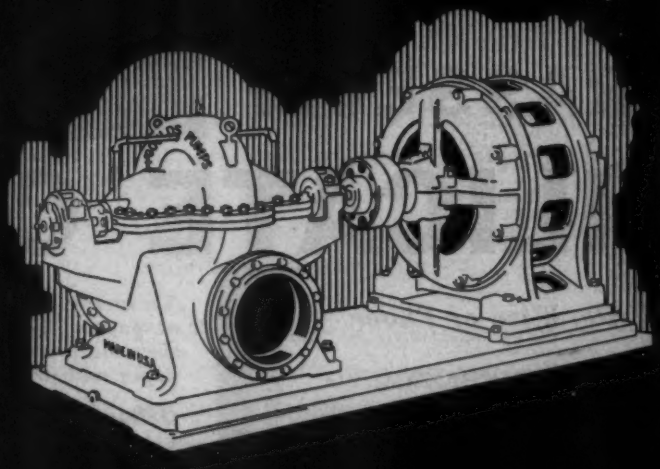

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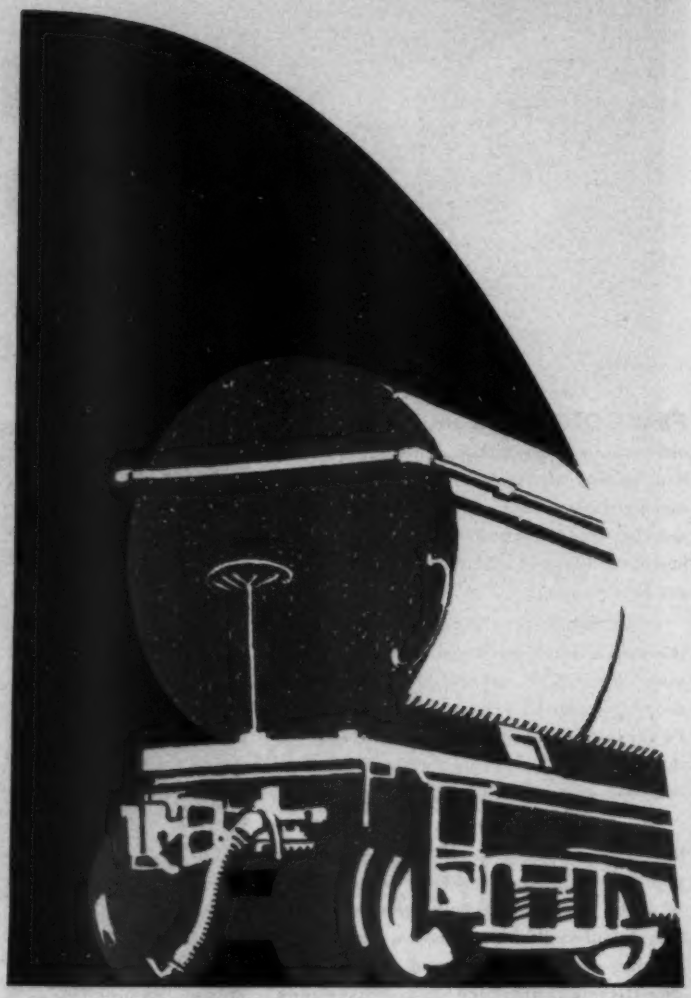

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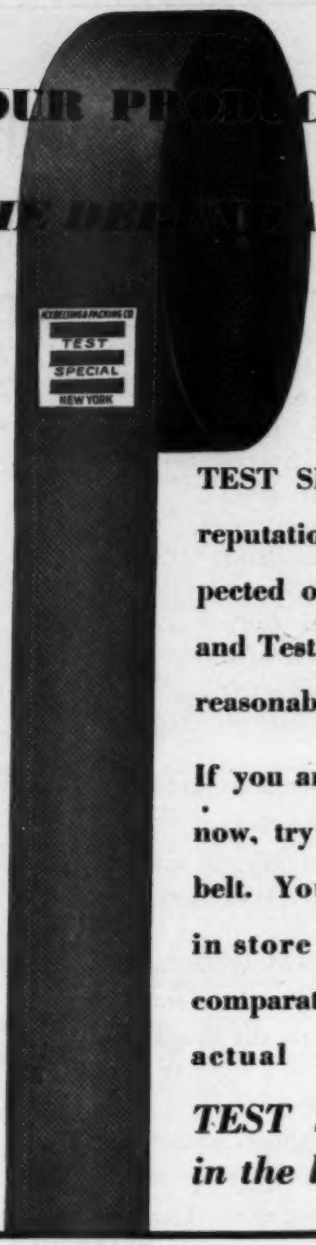

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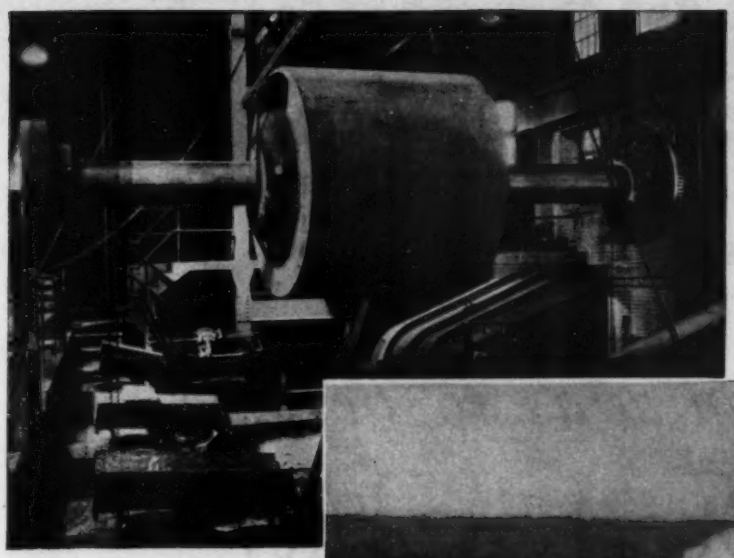

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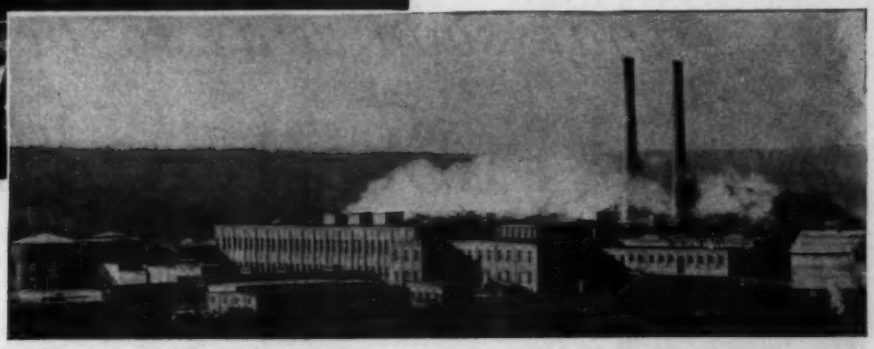

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Features of Winder Design

A summary of some of the factors involved in the designing of slitting and winding machines

By GEORGE B. RICKARD

A WINDER or rewinder in its essential parts is a very simple machine. It consists of a pair of rolls or drums driven by power and mounted on suitable supports. Paper, or other material to be wound, is passed over the drums and around a shaft resting upon them, which is thus rotated, winding the material into a roll. Combined with this is a suitable slitting element and an unwinding stand for handling the roll to be rewound.

In practice, other additions are required; but all of these are added for purposes of convenience in handling, or for correction of inherent mechanical difficulties in the machine itself.

The Theory of Winding

There are two methods of threading the material with relation to the winding drums: either between the drums, or over the front drum as indicated in the Figures 1 and 2.

The static forces are indicated in Figures 3 and 4. It will be seen that when commencing to wind there is

Fig. 1.

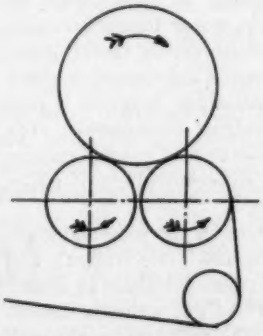
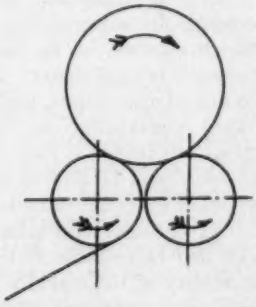


Fig. 2



a "nipping" effect caused by the small roll lying in the valley between the drums. This effect, as will be seen by comparing the diagrams, decreases very rapidly as the roll increases in size and becomes negligible; but it has an important effect in helping to give a hard wound roll at the commencement where it is needed, due to the neglible weight of the wind shaft, which

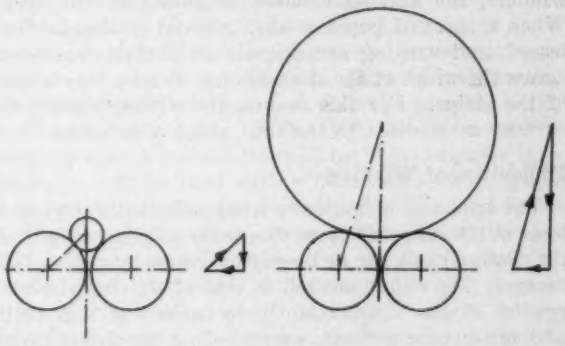


Fig. 3.

Fig. 4

otherwise would tend to slip on the winding drums and wind loose.

The diameter of the winding drums, distance apart, and size of the rewind shafts need careful proportioning to obtain the maximum effect within the allowable mechanical limits.

As soon as motion is imparted to the drums, it is necessary that there be sufficient friction between the rewound roll and the drums to cause the former to rotate without slip. Since friction is in direct ratio to the mass of the rewound roll, it will be seen that, in spite of the help given by the nip of the drums, there will be a tendency to wind very loose at the start and very tight at the end of a run.

Various mechanical contrivances have been developed

to overcome this difficulty and to produce a roll of uniform density from center to circumference.

The Theory of Slitting

The requirements of a suitable slitting mechanism from the viewpoint of operation are: first, a clean-cut edge; second, a square-cut edge without overlaps or ridges; third, an absence of slitter dust; and fourth, accuracy of cut. In addition, ease of replacement and adjustment, minimum repair bills and foolproof design count heavily.

Many winders are equipped with some form of overlapping rotary shears in which the lower element is power-driven and the upper is rotated by contact. This form of slitter has the great advantage of a very thin cutting shear, which will penetrate even heavy board without causing much wedging action; and, having a scissor-like action, it will cut very cleanly even short-fibered materials. It has the disadvantage of causing a slight ridge on the under side of certain classes of board, which is sometimes objectionable.

The so-called score cut, in which one slitting wheel cuts against a hardened steel roll, has certain advantages. It can be used for slitting waxed papers or those with a fine and delicate finish without causing marking, and there are certain mechanical advantages in its favor. There is, however, the difficulty of making a slitter wheel thin enough to avoid wedging when slitting heavy board and paper. It is also hard to manufacture a wheel which will retain its cutting edge without frequent re-sharpening.

So far as accuracy of cut is concerned, this is entirely a matter of design. In this connection, the location of the slitters is of great importance. In many winders, the slitting element is placed at the rear. When a sheet of paper is slit, internal strains are released, and varying atmospheric and other conditions across the width of the sheet tend to cause a side weave of the strips. For this reason, the slitting should be as near as possible to the first point of winding.

Difficulties of Winding

The tendency of paper to wind soft at the start and loose at the end of the run, due to the varying weight of the rewound roll, can be largely overcome by mechanical means. The oldest method is that of driving the two rewind drums independently by means of slip belts and taper cone pulleys, overspeeding the front drum at the start when the winder is threaded between the drums, and gradually reducing the speed automatically until both drums are at even speed when the roll reaches a large diameter. While this method helps, it is apparent that it is not exact, as friction is a varying quantity depending upon many extraneous conditions. In addition, while this method corrects in some measure the soft core, it does not correct a hard exterior, which only begins to show at about 20 inches in diameter.

Another partial remedy is the application of downward pressure to the rewind shaft through the bearings at the start of the run, gradually releasing this pressure, and in some cases applying an increasing upward lift as the roll increases in size. This is done either by hydraulic or mechanical means. Such a method is effective on narrow machines and where the wind shaft is heavy in section; wide machines usually have wind shafts of tubular section to reduce weight in handling. Hence, pressure applied at the bearings is not communicated to the whole width of the rewound roll, and the wind shaft tends to bow in the center. The method has been most useful in the case of supercalendered book papers where the hardness of the roll is a serious problem.

A much more effective method is the use of a top roll resting upon the roll of paper and automatically counterweighted so as to gradually relieve its weight as the roll of paper builds up. This roll should, of course, be mounted in anti-friction bearings, and may be either power-driven or rotated by contact with the rewind roll. The advantages claimed for the top-driven roll are: elimination of all drag on the sheet, and in some cases an overspeed tending to slightly iron the sheet and to pull it tightly around the rewind roll. The advantage of the undriven top roll is chiefly a great reduction in the amount of mechanism, providing plenty of clearance for the projecting ends of the rewind shaft. Actual experience in the mill also shows that there is no perceptible difference between the two, some mills having removed the drive without noticing any difference in action.

Another method which has been successful in reducing the density of the roll at the outer layers consists in reducing the diameter of the rear drum so as to give a retarding action to the sheet between the drums, where the machine is threaded over the front drum. Theoretically, this is incorrect, as it would cause softness at the start of the run. Actually, the various agencies for overcoming the softness are most effective at this point; therefore, the density can be controlled here. At the large diameters, particularly at 36 inches to 40 inches, the reduced density of the roll is strikingly apparent. A reduction of from 20 to 30 thousandths of an inch in a drum of 14 or 15 inches in diameter is very effective.

The method of controlling the density of the roll by means of tension has been largely abandoned, as the human element is very uncertain at the best. The tension control is now used mainly to maintain an even tension as the mill roll decreases in size and the momentum decreases. Strains produced by tension will cause distortion after slitting, and being released after the paper is slit, or after it is unwound in the press room, will cause trouble there.

A very important development is that perfected recently by some of the electric motor manufacturers, which consists of an independent direct motor drive for each rewind drum. The desired over-speed is given to one of the drums, and the variation in speed is provided electrically as the winding progresses. The great advantage is that the amount and rate of change of speed can be altered to suit different kinds of paper or other material to be handled.

Certain characteristics inherent in the material itself are still more difficult to overcome. The warmth and humidity of the machine room cause the sheet to absorb and retain moisture which will dry out, causing shrinkage of the outer layers when the roll lies in the cool storage room; thus producing an additional exterior hardness.

Other difficulties are caused by imperfections in manufacture: Calender cuts, welts on the reel, vari-

ation in gauge across the sheet, wet spots and other things cause plenty of trouble on the winder. Greater care in manufacture and handling during the manufacturing process has done much to reduce these troubles, and most up-to-date mills are constantly making progress in this direction.

The demand for larger diameters of the rewound roll has caused much difficulty. In a newsprint roll 72 inches wide, a 2-inch increase in diameter at 32 inches adds about 200 pounds to the weight, and every 2 inches added above that again increases the weight in an increasing ratio. Increased widths of machines also necessitate much more care in handling during the threading, splicing and winding of the material.

There is a fourth class of difficulties due to possible defects in the winder itself. Great care has to be exercised when adding attachments that the addition will not tend to counteract against some other function of the machine. It is also easy to so overload a machine with additions and corrective parts as to make it ponderous and difficult to handle while in operation.

The increase in newsprint machine widths from two rolls to three and a half and four has further added enormously to the problem of design. It is obvious that roll and drum sizes cannot be increased in like proportion, yet doubling the width of a machine increases the deflection of all rolls by 700 per cent. When the diameter of the rewound roll is increased at the same time, it is evident that the problem is a severe one. When the speeds of the machine are raised from 800 feet per minute to anything up to 1500 feet per minute and the winder has to be speeded up to 3500 feet per minute to keep up, further troubles are in store.

At these high speeds, questions of dynamic or running balance become pressing. It is found that a balance which was satisfactory under the old conditions becomes intolerable under the new, due to the necessarily slender section of the roll; and an extremely delicate balancing method must be adopted in which ounces of weight make the difference between a smooth running roll and one which would almost jump out of the machine. A few years ago, there was no machine on the market for dynamically balancing rolls over twelve feet long, and machines for this purpose have had to be designed and put into operation. This subject of balance bears a close relation to slitter shaft design, which has always been a hard problem to solve. It has, however, been satisfactorily overcome by correct balancing or by the use of individually-driven slitter units.

While it is true that the finishing room does not make the same demands that the machine room does, it is also true that the requirements of printers and users of specialty papers have stiffened considerably. This particularly applies to coated and supercalendered papers. Rolls of this class of paper always tend to show circular welts due to the high temperature steam used in calendering, but now these are no longer tolerated. It is also much harder to obtain a roll that will not "snap" due to the fact that a supercalendered paper has no air pockets or "mesh" to trap the air when wound; and at the same time, with a heavier paper it packs layer upon layer and makes an exceedingly hard roll. Greater speeds and widths with increased diameters have been the rule here also; so that this field presents plenty of difficulties.

There is one direction in which demands have not changed very much as regards winding: this is the board machine. Speeds are slow enough to be within control and widths are no problem, while the diameter of rolls has always been large. There is some trouble in providing for removal of the large and wide rolls, and the matter of slitting a heavy material has already been referred to.

Operation

On this subject, a whole book could be written. The trend is definitely set in the direction of automatic handling, which leaves the operator free to attend more carefully to the sheet and roll. A machine provided with motorized and labor-saving devices also leaves the operator in better physical condition to attend to his work; besides reducing the number of men required to operate the machine.

The control of the unwinding stand and speed of the winder ordinarily requires the entire attention of an operator. With automatic control of the brake so as to insure even and constant tension, better results can be obtained with less effort. Devices now in use and being developed will accomplish this result.

Threading is another tiresome and tedious job. The use of air jets for this purpose has made possible a simple and direct thread without the need of an operator crawling under the machine to pass the sheet.

The adjustment, setting, and replacing of the slitters require considerable care. When placed at the front this can be done while the machine is threaded without disturbing the set-up. The slitters located at the rear do not offer this advantage.

The handling of trim is done entirely by air in modern mills which blow it directly to the beaters through suitable chutes. When the trim drops directly to the basement, a gentle stream of air above the cutting point is all that is required. If the trim has to be carried some distance, a suction induced by blower nozzles into the ducts may be used with a fan system in the basement, or the nozzles may be omitted. Care should be used not to create a heavy drag on the trim at the cutting point as it will cause it to snap and produce checked or cracked edges in the sheet. A roller to support the trim is often used. In some instances, where the trim is narrow, it is sucked through the fan itself. It can be drawn a distance of 350 feet in this way, and discharged on the outlet side of the fan.

The handling of the rewind shafts into the machine, removal of the finished roll and delivery to the floor is usually taken care of by means of electric motors controlled by push buttons in the modern winder. When discharged, the roll passes to the wrapping machine to be wrapped and headed.

The future of the winder lies broadly along lines already indicated. Much needs to be done to completely motorize and automatically equip it, leaving it sufficiently flexible to be adjustable to the great variety of paper and boards now manufactured. It would appear as though the demands made on the winder, which have produced its present state of development, may point the direction for future development of the paper machine itself.

Technical Control in a Writing Paper Mill

Classification of control functions in mills with suggestive routine tests for standardizing manufacturing processes

By CARL SCHNEIDER, Chemist
Hawthorne Paper Company

TECHNICAL control in general is about the same for any paper mill, although in detail it varies with the different kinds of mills, as, for example, control in a book and coating mill, kraft mill, news mill, tissue mill, writing paper mill, etc. Even in different paper mills making one and the same kind of paper small differences may be noticed in methods of control because of conditions and the personal viewpoint.

Concentrating on technical control in a writing paper mill, it may be said to consist of four parts:

1—Examination of raw materials.
2—Aid to superintendent in the manufacturing process.
3—Examination of the finished paper.
4—Determination of the qualities a certain paper must have to meet customers' requirements.

Raw Material Examination

The most important raw materials to be considered are: rags, wood cellulose, rosin size, alum, the different fillers, starch, and glue. Tests available for rags include: determination of moisture, cupraammonium, viscosity, dirt, filler (such as starch), bleachability, and soda solubility. In addition to these tests, rags may be subjected to a physical test the same as used to test the strength of wood pulp.

The viscosity test is a very good test for the determination of the quality of the rag fiber. However, to be as nearly accurate as possible, it is advisable to use it along with the physical strength test. This recommendation is made because of a personal experience in which the viscosity test was not confirmed by actual results in the mill. It might be stated very positively that in the case cited the chemical and mechanical processing in the mill was very well done, as indicated by chemical and microscopical examination of the finished paper. Yet the strength figures of the paper made from these rags were too low for the grade of rags used.

The bleachability test is a very important one to make on rags, as colors used in the textile industry are getting faster every day. It is sometimes impossible, because of color fastness, to obtain a good white and still have any strength left in the fiber. In white rags, of course, no such trouble is experienced.

The soda soluble test is a good, simple test to make for the deterioration of cotton fiber as might be caused by the bleaching process.

Tests for color, dirt count, and strength-consisting of Mullen, folding, and tear, should be made on wood cellulose. Freeness of the pulp after beating and the pH value should also be determinated. The pH value of pulp is not ordinarily given enough consideration, yet it is very important. This importance may be further emphasized by suggesting that authorities in this field have found quite a deterioration in strength of sulphite after only two to three months' storage because of residual acidity.

Tests on rosin size include determination of cleanliness, free and combined rosin, alkali and total solids, while tests on alum made in a writing mill include determination of insoluble matter, alumina, sulphuric acid, iron and free acid.

The different fillers are examined for color cleanliness, grit, and retention. A test for calcium carbonate is also helpful as the presence of too much carbonate might cause trouble on the paper machine, and necessitate a greater expenditure for alum than should be required.

Starch is examined for color, moisture, mineral matter and gelatinization power; glue is tested for color, acidity, fatty matter and gelatinization power.

Aid to Superintendent

A portion of the phase of technical control, which serves as an aid to the superintendent, has already been mentioned; namely, examination of raw materials. Technical control in processing of the fibrous raw materials and also in the actual making of the paper are likewise essential. The cooking of rags, for example, should be under control. Such control permits the determination of the proper kind and amount of alkali for the liquor. Then, control should be exercised over the cooking pressure and duration of cook. If too much chemical, or too high a pressure, and too long a time is used in cooking, the cotton fiber may lose considerable strength. On the other hand, if the cooking operation lacks on any of these points, the stock may not develop the desired qualities. The washing and bleaching of the rags is the next step in processing that requires control. In washing, the question arises as to when the rags should be washed. Should washing take place immediately after the boiler has been blown off, or should the rags lie a while? Quite a difference of opinion prevails on this point. The temperature of the wash water should not be disregarded. Bleaching should be controlled very carefully, as the fiber may be robbed of most of its strength if this operation is improperly done; yet enough bleach liquor must be used to get a good white color. Finally, the time of storage in the drainers should be checked if optimum results are to be obtained.

In judging the progress and also the end point of beating, the beater engineer is still depending very much on his sense of feel and sight. A freenes tester for measuring the degree of hydration and a dark blue colored glass about six by six, to facilitate the sight of the fiber length, is of great help in controlling the beating operation, and does away with a lot of guessing.

Differences in opinion often arise between the beater engineer and the machine tender as to proper beating condition of the stock. These differences can be settled quickly through the proper use of the two previously mentioned instruments.

After the fibrous raw material is in the beater, the filler chemicals and color are added. The filler should be added as soon as possible in order to obtain as perfect a mixing with the stock as possible. When to add the color is more of a question. Technical control must determine this point. In most cases, it is best practice to add the color before the chemicals, but there are exceptions to the rule. The order of adding chemicals may be changed due to water conditions or some other special consideration. A well-paying subject for technical control is the emulsification of the size and the strength of the emulsion. In order to get maximum efficiency from the size, the temperature during emulsifying and the strength of the emulsion must be maintained at the right point. The beater temperature must also be under control and kept as low as possible. If the temperature in the beater rises above 100 deg. Fahr., sizing efficiency decreases.

The stock, ready to be taken on the paper machine, offers another opportunity for technical control. If foam develops, the cause must be determined and eliminated. Paper must come off the machine with proper moisture content. Ovens especially built for moisture determination in paper are available, and the technical man can easily instruct the back tender how to use such an oven for purposes of control. If the paper is poorly sized, all prevailing conditions must be checked in order to remedy the trouble. All at once, specks or other imperfections may appear in the paper. Some specks are easily identified; others are hard to characterize. One of the greatest drawbacks in the identification of specks is the time such work consumes. Any one who is able to develop rapid means for identifying all imperfections will certainly make a name for himself.

Examination of Finished Paper

The finished paper, first of all, is examined for its general characteristics, and such tests are applied to it as are necessary to assure the manufacturer that the paper is up to its standard quality. These tests are well known and need not be mentioned. There are, however, special tests, determined by the customer's specifications and special uses to which the paper is to be put, that must be considered. For example: if the paper is to be exposed to high temperature, the technologist must assure himself that the paper will stand such treatment with the least possible changes in its appearance and strength. If the paper should have to stand excessive moisture, then it should be known that the paper is extra-hard sized and that it will not wet through too quickly or even tear apart.

Meeting Customers' Requirements

The subject of special tests naturally leads to the determination of the qualities a certain paper must have in order to answer the customer's requirements. In order that technical control be effective along these lines, two things must be available: first, a sample of the paper (if possible, a sample before and after processing); second, as much detailed information as possible regarding the customer's requirements. This point should be emphasized as the average technologist is no magician. With necessary information on hand, the technical department is in best position to serve the papermaker and give him a chance to meet necessary specifications when making the paper.

There are quite a few more instances where technical control in a writing paper mill can be applied to advantage. If the technical department is on the alert, it will not be hard to find a number of additional control opportunities that will prove of value to the mill.

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A Builder of Early Fourdriniers

MUCH credit is due to the work of Bryan Donkin in developing and introducing the machine now known as the fourdrinier. The idea for this machine, originating in the mind of N. Louis Robert and forming the subject of a patent of John Gamble that was subsequently assigned to the Fourdrinier brothers, was crystallized into a practical machine through his creative efforts.

In 1801-2, while in the employ of a Mr. Hall of Dartford, England, Donkin was intrusted with the construction of a model of the machine. After many trials and considerable expense, work on the machine was dropped, as paper produced upon it was too inferior in quality to sell. Sometime later, Donkin made arrangements with the owners to continue his work and opened up a shop of his own for the purpose. It should be said that in this work he was very courageously financed by the Fourdrinier brothers. When the invention became a practical reality, they had expended approximately £60,000, a sum of such magnitude that it forced them into bankruptcy.

Donkin succeeded in producing the first successful, although not completely satisfactory machine in 1804. This machine was installed in a mill at Frogmore, Herts. A second machine with further improvements, and said by some to be the first commercial machine, was built the next year and was erected in a mill at Two Waters.

The wire of the machine, as installed in the mill at Frogmore, is said to have been 48 inches wide and 27 feet long. The machine at Two Waters is said to have had a 60-inch wire. No machine of greater width than this was made for a number of years. In fact, one reference suggests that no machine was constructed with a wider wire than 60 inches until 1840.

Donkin continued to manufacture these machines during the years, and by 1810 had erected 18 machines in various mills. Forty-one years later, his 191st machine was constructed.

Published records further indicate that the machine originally built by Donkin cost about £1400, while in 1813 an improved design of the same capacity cost £1000.

Of course, these machines were simple when compared with modern machines, but through their development has come the incentive that has made possible the tremendous expansion of this indispensable and basic industry.

How a Paper Mill Reduced Power Cost

Installation of extraction type turbine saved over $32,000 annually

By W. F. WEBER, Mechanical Engineer

THE increasing importance of lower production costs has made mill owners and mill managers keenly alert to all methods of cost reduction. Studies conducted along such lines have resulted in many modern installations of steam and power generating equipment. Improvements have been made in boiler room methods, modern boilers and auxiliaries have been installed, and in some instances electric power generation has been considered and adopted.

In many instances, however, the improvement in methods and equipment has stopped at the boiler room, considerable hesitancy being felt regarding the installation of electrical generating equipment. While it is true that every mill presents a different problem from the standpoint of electrical power requirements, and the possibilities of subsequent savings through its generation, it is equally true that the profits that may accrue, or may be overlooked, are large. So large, in fact, that the matter should be given careful study, not only by the mill management, but by competent engineers who are specialists in such work. The following results taken from actual operations are typical of what may be accomplished.

The mill under consideration operates six Stirling type boilers rated at 398hp. each. The boilers are all stoker equipped, designed to burn nut and slack coal which was readily and economically obtainable in the locality. Steam is generated at 195 lb. gauge pressure, without superheat; and the normal load is carried on four boilers operating at from 150 to 160 per cent of normal rating.

Electrical Generating Equipment

For the generation of electrical energy, two extraction-type turbo-alternators are used. The smaller unit is rated at 1,500 kw., and the larger unit at 2,000 kw. Under normal operating conditions, the smaller unit is used for week-end loads, operating full condensing, and is held in reserve as a stand-by unit at other times. The smaller machine was installed several years prior to the installation of the larger, and savings that it effected have repayed its initial investment. The following facts will, therefore, be confined to the larger unit, but the principles underlying its operation will apply to both.

The 2,000-kw. machine is direct-connected to a 2,500-kv.-a. alternator running at 3,600 r. p. m. and generates 60-cycle, 3-phase power at 440 volts. An average power factor of 96 per cent is maintained, due in part to the over-excitation of the synchronous motor on a 360-kw. motor generator set.

Steam pressure at the turbine throttle averages 190 lb. gauge. About 60 per cent of the total steam input is extracted for process use in the dryer rolls and for water heating in connection with the beaters and rotaries. The extraction steam is obtained at about 26 lb. gauge pressure and the remainder exhausts into a surface type condenser on which the vacuum averages 28 inches. All condensate from the turbine, dryer rolls, heaters and small auxiliaries passes to an open-type feed water heater where the feed water to the boilers is maintained at an average temperature of 210 deg. Fahr.

So much for the more or less technical description of the equipment being considered. Needless to say, the plant is equipped with flow meters, fluid meters, and watt-hour meters, permitting the systematic recording of all essential operating data.

From this operating log, the following summary of facts was secured covering a six-month period of operation:

Operation	2,600 hours
Electrical energy generated	4,236,030 kw.-hr.
Total steam used	155,004,400 pounds
Steam extracted	94,202,650 pounds
Electricity generated per hour	1,629 kw.
Steam used per hour	59,617 pounds
Steam extracted per hour	36,232 pounds

For the 2,600 hours of turbine operation it is apparent that an average load factor of 81.3 per cent of rated capacity was maintained.

Operating Cost and Savings

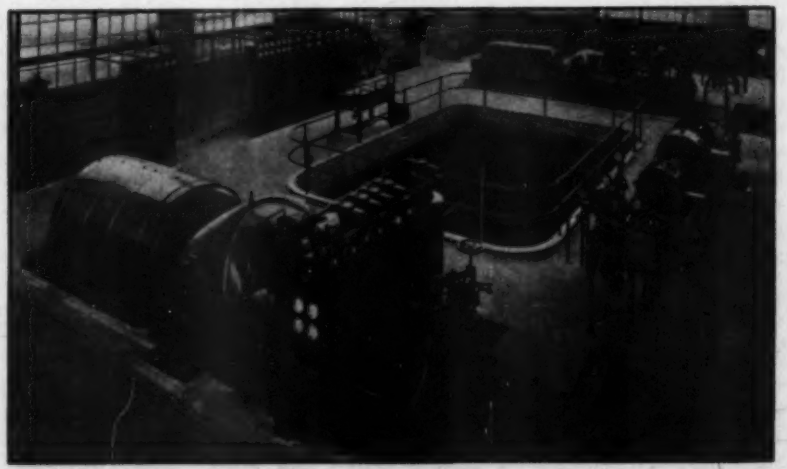
In any calculation of generating costs it is necessary to determine the steam cost, both at the boiler and after extraction. In these calculations, a cost of $.35 per thousand pounds was determined for the generation of steam at the boiler.

Thermodynamic calculations, too complicated to detail at this point, indicate that 93.6 per cent of the heat initially supplied at the turbine is available for process use in the steam extracted at about 26 pounds gauge pressure. On this basis, the average hourly cost of steam supplied the turbine, from the data as shown in the log, would be $20.87. This charge, however, is subject to a credit of $11.87 for the steam extracted for process use, indicating that the net charge of steam for power generation is but, $9.00 an hour.

In determining the total cost of electrical power generation by the turbo-generator, it is necessary to complete the calculations by adding such charges as depreciation and interest on the equipment investment, maintenance and repair charges, and operating labor. These costs for the installation discussed, prorated to an hourly basis amount to $2.69 an hour.

By adding the hourly operating cost of the unit, and the steam cost as determined above, it is apparent that the total generating cost is $11.69 per hour. On the basis of the 2,600 hours of operation from the log of the period considered, the 1,629 kw.-hr. of electrical energy was generated at a cost of $.0072 per kw.-hr.

With these facts at hand, it is now possible to consider the economic advantages attendant to such operation. The use of purchased power would, of course, eliminate the necessity for the equipment considered, and boiler steam would be throttled for process work. As shown



A modern turbo-alternator installation in paper mill service

in the log, 36,232 lbs. of steam per hour were extracted, and as explained 93.6 per cent of the heat in this steam was available for process work. The steam cost for process steam is, therefore, $11.87 an hour, regardless of whether it be extracted from the turbine or throttled under similar conditions from boiler pressure.

Purchased power under the contract imposed was available at $.011 per kw.-hr., exclusive of additional demand charges of varying amounts. On the basis of the amount of electrical energy used during the six-month period considered, the power cost would average $17.92 an hour, if purchased. The total of purchased power and process steam would, therefore, amount to $29.78 per hour, that is $6.22 more than the cost of these items under the method used.

This saving indicates a reduction of 21 per cent in power and steam costs, which, on an annual basis, would represent a saving of over $32,000. Considering the cost of the electrical generating equipment and its installation, the annual saving shows a return of over 44 per cent on the investment.

These facts have not been presented with the view of indicating operating figures of maximum efficiency, but rather to point the way to economies which may be effected and savings which are obtainable by careful analysis of the problems involved.

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◆ Chemist Discovers that Colored Light Protects Food

An important discovery which has innumerable industrial applications, has recently been made by Mayne R. Coe, a chemist in the Bureau of Chemistry and Soils, U. S. Department of Agriculture.

It has been known for a long time that light causes certain things to spoil. Manufacturers wrap chocolate in tinfoil to keep out the light. With the same object they put other products in tin cans, brown or amber bottles and dark store rooms. Sunlight also affects milk and medicines. Pharmacists have long been aware that certain drugs keep best in glass colored to shut out rays from the parts of the spectrum near the ultraviolet bands. In several cases these rays hasten decomposition.

In his experiments on food products, Mr. Coe exposed his samples in different colored Cellophane wrappers and tested them also in darkness. Almost invariably, such things as butter, lard, cottonseed oil, potato chips, and peanut butter became rancid after a short time in all the wrappers except the green and black ones. These experiments were subsequently repeated with color filters of known light transmission. Some of the products naturally spoiled sooner than others. It became evident that it was the wave-lengths of light that were absorbed that did the damage. Green light proved to be photochemically inactive on oil-bearing foods. Green containers protect because they exclude all other colors. Black is equally protective because it keeps out all light.

Men and Payrolls

By E. J. CLARY

RECENTLY, a manufacturer stood near his paymaster's window as a number of workers filed past. All these men were reluctantly being "let out." Most of them were skilled. Each of them knew, from long experience and practice, how to do one thing exceptionally well.

"Every one of these men," said the Boss, "is carrying with him something that belongs to me."

"I don't get you," said the pay-clerk.

"Well," responded the Boss, "they have been trained on *my* money. Of every dollar I have paid them, a part has been invested in their better skill and experience. It would cost me nearly $1,000 per man if I had to hire and train green help for those same jobs tomorrow. Part of every week's pay has been invested in experience that insured a better job tomorrow, next week or next month. That's what it costs to lay them off."

PEOPLE are the most important factor in any business—not machinery, not raw materials, not land nor buildings. People trained in *your* ways. People in whom you have made a cash investment, in whom you have built up a reserve of the "know-how." Their skill and experience are reflected in the quality of the product, and in its continued betterment; in speedier production without danger to sustained quality; in the protection of your machinery; and in the co-operative spirit that pervades your well-managed workshop.

Only occasionally can skill be bought outright and ready-made at a moment's notice. There is no wonderful lamp yet known that will produce an artisan fully equipped with the "know-how." Only time, money and patient schooling pull through even the best of workers to something approaching what is needed in skilled workmanship.

THE GREEN OPERATOR is a stumbling block on the product line, a burden on the payroll. But, if he learns through error and reacts to guidance, his time quickly shows a profit on investment.

Our workshops must stand the strain of freshmen artisans before they can hope to profit on the speed and accuracy of sophomores and seniors.

No well-managed workshop expects its payroll dollar to buy so many workmen's notions or so many ideas out of foremen's brains.

Count that job lost which fails to prepare the workman to do a better one on the next. Machinery, equipment and the material assets of any business run down and grow rusty, but the tendency of the willing and earnest workman is to increase in ability with time. The payroll dollar makes a better investment where management is geared to get speedier skill from every one in the shop.

THERE ARE TIMES when only loss follows in the footsteps of the man who is let out for the sake of economy, and many a workman carries away some portion of your product's quality with his last pay.

Employers learn that operations on payrolls may be successful, even though the patient dies.

The workman cannot shed his skill, experience, special knowledge and leave them in the locker for the next fellow like he sheds his overalls and his hat. What he owns in experience and ability sticks with him, like his shadow, when he leaves the workbench for good.

Trained workers in all lines are plentiful, except when you need them, and then you find they are trained in the *other fellow's* ways and not yours. The fired workman carries the knowledge you paid for around with him like a suitcase, and it's something he can sell elsewhere.

In these times, when employers are scanning and thinning payrolls, it pays to make sure how much it will cost to fire a man. The cost of firing very often is higher than the cost of hiring. New help bungles. Product suffers.

No Boss ever made an error by sleuthing for more roomy, more likely places to swing the axe than in the payroll. When the chopping starts on the payroll, the soul and spirit of the shop may fly away with the chips.

Nothing is more dead than a workshop with the *people* gone.

The idea that there are millions of people to fill jobs when there are jobs to fill is but skim-milk solace for the employer who, in a flurry of fear, sends trained employees packing.

Of course, there are times when payroll cuts have to be made—reluctant as an employer is to make them. But they represent a form of economy that is doubtful in results, especially with regard to *skilled* labor.

Whether you employ ten workers or ten thousand, the principle is just the same. Your investment in their special skill and knowledge is proportionately as heavy.

THE WISE EMPLOYER looks around for another way out—makes sure he has missed nothing else before he lets his experienced helpers go. He looks especially for leaks in operations to see where he can make extra savings that will enable him to conserve his labor supply. He looks for ways to widen his market and increase the demand for his goods. He bears down harder on his selling forces and on those individuals whose job it is to find buyers for his products.

After all, it's orders that keep wheels turning. But, it is what comes in pay envelopes that buys the skill that makes *filling* the order possible.

YES, people are the most important factor in any business.

Eighty-Four Years Ago

Wisconsin had but one paper mill

A history of the establishment and development of this industry shows it now ranks third in the Badger State

By J. H. H. ALEXANDER
Wisconsin Manufacturers Association

FROM an almost microscopic beginning when the first Wisconsin paper mill was established in Milwaukee in 1848, the manufacture of paper and pulp has grown to become the third ranking industry in the Badger State, with a combined annual production in excess of $125,000,000.

This earliest recorded pioneer Wisconsin paper mill was owned and operated by Ludington and Garland. It stood about one block from the present site of the West Water Street bridge across the Menominee River in the heart of what is now Milwaukee's warehouse district. Ten workmen, with a total payroll of about forty dollars weekly, were employed in the manufacture of newsprint from salvaged rags. The weekly output was 110 reams of paper — "more than sufficient to supply every printing press in the state," to quote an early writer — with a good market for the surplus product in Chicago.

The decade which followed the establishment of the Ludington and Garland mill has left no record of the establishment of another paper mill in Milwaukee or elsewhere in Wisconsin. The scarcity of paper during the Civil War, however, stimulated the expansion of the industry in Wisconsin and elsewhere in an effort to increase the production of this necessary commodity until, by the end of the great struggle, there were three or possibly four mills in operation in the Cream City and development was well under way in other sections of the State.

Attractive waterpower on the Rock River at Beloit was employed for papermaking when Wright, Merrill and Newcombe erected a mill there in 1855. A second mill followed in 1857, but its name has faded. Beloit, at one time, had four paper or strawboard mills in operation; and such names as Rock River Paper Company, Beloit Straw Board Company and F. N. Davis & Company were well known in the trade.

Nekoosa Mill from the air

The manufacture of paper mill machinery in Beloit commenced in a small way, no doubt, in response to the local paper mill needs. This industry has outlived the paper manufacturing industry of the Gate City where it has grown to make that community one of the leading producers of paper and pulp mill machinery in the United States.

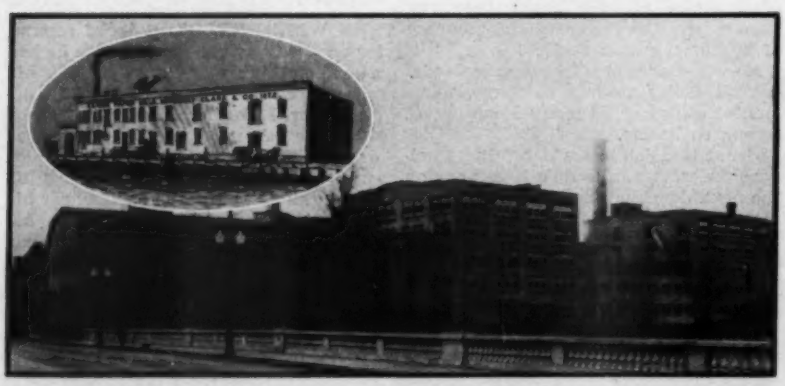
Another early paper mill was established and operated by J. H. Crombie at Whitewater in 1857. Before 1872, Fond du Lac boasted two mills owned and operated by Nightingale, Bosworth and Company, and by George Hunter; while J. L. Mathers operated a mill at Sparta. Except for these enterprises, no records remain of further development of paper manufacturing during the pioneer period in southern Wisconsin.

The development of the paper industry in the Fox River valley dates from the establishment in 1855 of the Richmond Brothers' mill below the lower dam in Appleton, where straw wrapping paper was manufactured. From this beginning, paper and pulp making eventually grew to be the leading industry of the lower Fox River valley when wood supplanted rags and straw as the raw material from which paper was made.

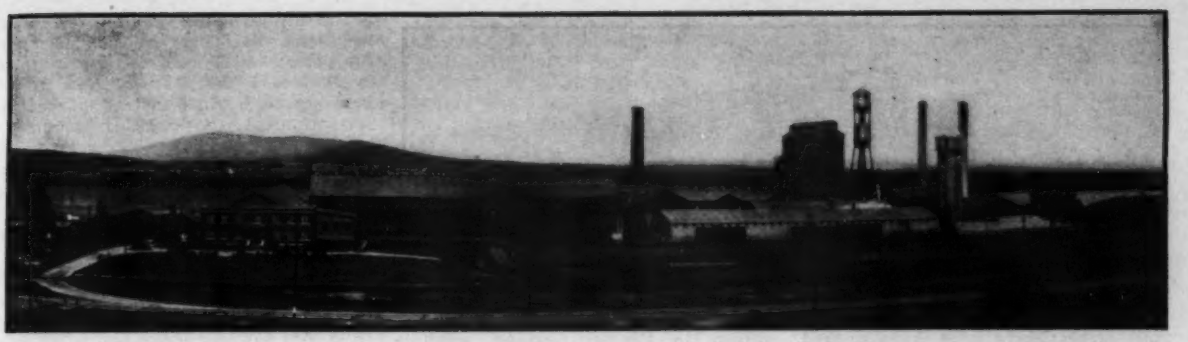
Here excellent waterpower, provided by the drop of 170 feet in the course of the Fox between Lake Winnebago—that great natural reservoir which with dams assured a uniform head of water at all seasons — and Green Bay, supplied a basic need of the paper manufacturing industry. In later years, when the use of wood pulp was perfected and generally employed, the proximity of a seemingly inexhaustible source of raw material operated to make the lower valley of the Fox the greatest paper-producing locality of equal area on the American continent.

Neenah became the site of the second paper mill on the Fox River when the old Red Mill was erected in 1865 at the foot of the race upon the location originally occupied by the government sawmill of mission days. This mill was built by a stock company composed of: Hiram and Edward Smith, Dr. N. S. Robinson, James Jamison, Moses Hooper and Nathan Cobb. The officers were: Nathan Cobb, president; Hiram Smith, secretary-treasurer.

Myron H. P. Hayes was brought from Whitewater to superintend the mill. Using rags for paper stock—the advent of wood pulp was still ten years in the future—this mill was capable of produc-



Present mill of Kimberly-Clark Corp. at Neenah which stands on the site of the original mill, shown in inset



General view of Marathon Paper Mills

ing 3,000 pounds of paper daily. When it produced a record run of 4,799 pounds in twenty-four hours in 1883, the accomplishment was given laudatory attention by newspapers of the day.

In 1872, Kimberly, Clark & Company built the Globe Paper Mill at Neenah. Its equipment consisted of a 72-inch paper machine with a daily capacity of 2,000 pounds of paper made of rags. This firm originally consisted of four members: J. Alfred Kimberly, Charles B. Clark, Frank C. Shattuck and Havilah Babcock. In 1874, the Old Red Mill already referred to was purchased by Kimberly, Clark & Company and operated under its management until 1884, when it was torn down to be replaced by a modern mill that is still in operation. In 1878, the members of the firm acquired waterpower at Appleton, formed the Atlas Paper Company and erected a paper mill that is now owned and operated by the Kimberly-Clark Corporation.

The Genesee Flour Mill was purchased in 1879 by this rapidly growing company, and operated as a flour mill for two years, when it was converted into the Vulcan Tioga Paper Mill which manufactured high grade book papers. Thus we have the quite unique picture of a paper company owning and operating a flour mill at one stage in its early development.

By 1901, which really marks the end of the pioneer period in paper manufacturing, this firm owned and operated the following plants in Wisconsin: the Neenah, Globe and Badger mills at Neenah; the Atlas, Vulcan, Tioga and Telulah mills at Appleton; a plant manufacturing wrapping paper, newsprint paper, groundwood and sulphite pulp at Kimberly, and a plant manufacturing newsprint, groundwood and sulphite pulp at Niagara.

But to return to the thread of our story: Neenah was the scene of further paper mill development in 1874 when the Patten mill was built by A. W. Patten. During the same year, the Winnebago mill was built by John R. Davis who had as his partners John R. Ford, H. Shoemaker (or Schumacher), C. H. Servis, C. Newman, S. M. Brown, and Mrs. E. A. Servis. George A. Whiting bought out the Shoemaker stock in 1876 and was made superintendent and secretary of the Winnebago mill. The first book paper known to have been manufactured in Wisconsin was produced by this mill while Colonel Whiting was superintendent.

Papermaking began in Menasha when the Gilbert & Whiting plant was erected there in 1882. The Gilbert Paper Company plant was opened for operation in 1887 and during the same year the John Strange Paper Company developed from a pail factory. In 1888, the Menasha Paper Company commenced operations.

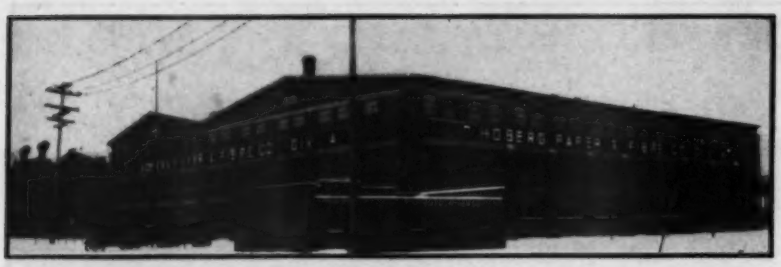
Appleton really became a factor in the paper industry in Wisconsin when the Ames Pulp Company began operations in 1873. The name of this company was later changed to the Appleton Paper & Pulp Company. It was originally promoted by Albert M. Hastings, of Rochester, New York. Here the Voelter process was employed, and it is possible that this installation antedated the installation made by Col. H. A. Frambach at Kaukauna. Other early Appleton mills of note were: the Western Wood Pulp Mills, operated by J. Bradner Smith Company; and the Valley Pulp Paper Mills, organized by Welcome Hyde.

It may be well at this juncture to mention the vitally important fact that prior to 1871 all paper manufactured in Wisconsin was made from cotton rags, white waste paper and straw. J. Bradner Smith, according to some authorities, introduced the mechanical pulp process into the Badger State in 1871 when, at the south end of the upper dam in Appleton, wood pulp was made ready for paper use by grinding poplar logs.

The first paper mill located at Kaukauna, the Eagle Mill, was built in 1872 by Col. H. A. Frambach who also built the Badger Mill and the Niagara plant later taken over by Kimberly-Clark Corporation. At the Eagle Mill, a machine was installed to grind poplar, spruce and basswood logs, and this installation is regarded by some authorities as the first wood grinding machine in Wisconsin while others are equally strong in their contention that it was the second. In 1885, the Thilmany mill, established by Oscar Thilmany, produced the first tissue paper made in Wisconsin. The Outagamie mill was erected during the following year by A. W. Patten, Henry Hewitt, Jr., W. P. Hewitt and A. W. Priest to add to Kaukauna's already extensive paper manufacturing industry.

Paper development was slower along the lower reaches of the Fox River. De-Pere did not boast a mill until 1891, when the Shattuck & Babcock Company plant was erected. Here high grade bond

Aerial view of Mosinee Paper Mills



Division A Mill of Hoberg Paper and Fibre Co.

and ledger papers were manufactured. This mill was sold in 1899 to the American Writing Paper Company.

Green Bay did not enter into the paper manufacturing industry along the Fox River until about 1900 when John Hoberg commenced manufacturing tissue paper, and when the Northern Paper Mills were built by McCormick.

The introduction of the sulphite process into Wisconsin is also a disputed point. It is strongly probable, however, that the first mill in Wisconsin and the second in the United States to use the sulphite process was erected in the spring of 1887 by the Appleton Pulp & Paper Company at Monico Junction. This mill employed the Partington process, using Globe rotary digesters. The Atlas Paper Company, of Appleton, was one of the first, if not actually the first, in the West to use the sulphite process in its pulp mill which was built in 1887. The first wood cooked by the sulphite process was spruce. Hemlock, which came into use later, was first cooked in Wisconsin by the sulphite process at the mill of the Kaukauna Fibre Company, but history fails to record the date of that event.

The sulphate process was brought to America by Olai Bache-Wiig from Norway in 1907 to the Brompton Paper & Pulp Company, at East Angus, Quebec, Canada. In 1910, he brought it to Wisconsin when he established the Wausau Sulphate Fibre Company at Mosinee. The founders of this company were: Neal Brown, Louis Dessert, F. P. Stone, G. D. Jones, M. C. Ewing, Karl Mathie, W. C. Landon, and A. L. Kreutzer, of Wausau; B. F. McMillan, of Marshfield, and H. M. Thompson, of Milwaukee. The company was originally formed to make thirty-five tons of pulp and fifteen to twenty tons of sulphate paper.

The Wausau Sulphate Fibre Company, now re-christened the Mosinee Paper Mills Company, has increased its production to 100 tons of sulphate pulp and paper daily. Five other sulphate mills now in operation in the state are: Tomahawk Kraft Paper Company, Tomahawk; Nekoosa-Edwards Paper Company, Nekoosa; Thilmany Pulp & Paper Company, Kaukauna; the Falls Manufacturing Company, Oconto Falls, which manufactures both sulphate pulp and paper, and the Stevens Point Pulp & Paper Company, Stevens Point, which makes 35 tons of sulphate pulp daily.

The greatest single impetus to the development of the paper industry of the lower Fox River valley and of the State at large came with the introduction of wood grinding for pulp. This is indicated by the marked growth and rapid development to be noted in the industry dating from the year 1871, when groundwood pulp was first used as papermaking raw material. Four years later, a second impetus resulted from the successful use of newsprint paper in rolls by newspaper printing presses.

According to G. F. Steele, who entered the employ of the Appleton Paper & Pulp Company in 1879 and has since been closely identified with the paper industry, wood pulp supplied the necessary raw material required to meet increased paper demands as newspapers put in the new style presses. He states: "At the time I entered the business, a great proportion of the newsprint paper used in North America was used in sheet form. At that time, the total consumption of newsprint on the entire continent was about 75,000 tons per annum." How far would that go today?

The advent of the rotary press using newsprint in rolls or webs dates from the perfection of such a press in 1875 by R. Hoe & Company, of New York. Printing from rolls instead of sheets revolutionized the printing industry, lowered the price of newsprint and greatly stimulated the paper industry as rotary presses using rolls came into more general use.

It is interesting to note how these two great stimuli to the paper industry coincided with the decline of the flour-milling industry of the Badger State. One may be excused a pardonable curiosity over the fate of the Fox River valley, especially, if paper manufacturing on a large scale had not been waiting on the figurative doorstep to offset the slump in the milling industry.

Along the course of the Fox, flour milling had reigned supreme prior to 1870, but during the next decade the number of flour mills in the valley decreased from 30 to 21. Several factors combined to bring about this result. Wheat yields had declined in Outagamie and Brown counties as a consequence of one-crop farming and of the chinch bug invasion. The strong and growing competition of Minneapolis mills was becoming increasingly difficult to meet. Iowa wheat—Iowa was a great wheat-growing state before it swung to corn—was finding its shortest route across Wisconsin to Milwaukee by rail, then via lake vessels to Buffalo and the eastern market. Wisconsin was, of necessity, on the threshold of diversified farming, with dairying playing the leading role. All of these factors contributed toward the decline of the flour-milling industry along the Fox River.

But the exceptionally fine waterpower that had once turned the millstones remained unimpaired and ready for greater development and utilization. Paper mills were built upon the vacated flour mill power sites or were established in remodeled flour mills. At least one of the largest present-day paper companies operated in pioneer times a combined flour mill and paper mill under the same management, but that unusual combination has been pointed out previously in this discussion. Where flour mills once flourished, only two or three now remain as reminders of the past greatness of this flour-milling region that held

Stevens Point Mill of Consolidated Water Power & Paper Co.

rank among the leaders in that industry about the time of the Civil War. By 1880, there were 12 paper companies reducing logs to pulp or manufacturing paper along the lower Fox, and today more than one-third of the paper and pulp mills in Wisconsin are located in this famous paper-producing district.

Outside of the Fox River valley, most of the paper manufacturing in the Badger State is located on the Wisconsin River, Flambeau River, Chippewa River or their several tributaries, though the Wolf River, the Menominee, the Peshtigo, and several other streams of size each contributes its share. Along the course of the Wisconsin, from Rhinelander to Nekoosa, with the center near Stevens Point, is a papermaking district ranking second only to that along the Fox in number of mills and total production.

This region became the scene of expansion and growth in 1886 when the first plant was built near Centralia, now a part of the city of Wisconsin Rapids, by Colonel Whiting, of Neenah, and G. Frank Steele, of Appleton. Three years later, this mill was followed by another Whiting project when a dam harnessed the power of Conant's Rapids and two great mills were erected below Stevens Point.

Differing markedly from the Fox River development of paper manufacturing upon the sites of decadent flour mills, papermaking on the Wisconsin, and in a measure upon other northern Wisconsin streams either followed lumbering, or was carried on jointly with the lumber mills then in operation, as a means of utilizing timber waste from trees too small for lumber, or of species then deemed to be undersized or inferior for sawing.

Rapid growth and expansion during the last thirty years have marked Wisconsin's paper industry and those businesses allied with it. Such cities as Appleton, Beloit, Green Bay, Neenah, DePere, Manitowoc, Wausau and others realize the importance of the presence of thriving, paper mill machinery manufacturing plants to their economic welfare. Badger cities supply the demands of the trade for papermaker's felts, wires, screens and dandy rolls, and workmen earn their livelihood in their production. Then, too, there are the factories that process paper into paper bags, cartons, corrugated shipping containers, cardboard boxes and paper specialties almost beyond enumeration.

This article purports only to sum up and pass on to readers a record of the rapidly fading footprints of paper pioneers of the Badger State, men whose names watermark the very pages of the history of Wisconsin's lasting industrial achievements; whose memory, nevertheless, has not received the measure of tribute that the present owes to the past.

What pioneer paper manufacturers and their mills did in the past is history; some of it written here for the first time so far as the writer can discover. In recent years, the industry has come to employ some ten thousand workers who receive more than $15,000,000 in pay envelopes annually. Today finds Wisconsin as a state ranking close to the top in both pulp and paper production. It also finds the industry within the State striving to meet the exigencies of the present period of general financial dislocation, and succeeding in its battle.

Thus we conclude our brief recital with only its beginnings dated and defined. Our story has no end, for today finds new history in the making for and by the paper and pulp industry of the Badger State.

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History of Northern Wisconsin, Western Historical Society, Chicago, Illinois, 1881.

Lockwood's Directory, 1929.

History of Paper Manufacturing in the United States by Lyman Horace Weeks.

Biennial Census of Manufacturers, 1929.

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◆ Nepco Plans New Addition

Nekoosa-Edwards Paper Co., Port Edwards, Wis., is said to have plans for the erection of building which will be an addition to the paper storage, finishing and shipping room of its Nekoosa mill.

This expansion has been brought about by reason of the development of new products, and it is stated that the new building will be part of a larger unit which the company contemplates in line with future development. All of the work on this building is being handled by the Nepco employees.

◆ THE LAKE STATES Section of the Technical Association of the Pulp and Paper Industry held its regular monthly meeting at the Conway Hotel, Appleton, Wis., November 15. Among the subjects considered, were two papers: one entitled "Care and Design of Pulp Strength Testing Equipment," by Paul Boronow, of the Valley Iron Works Co.; and "Speed Reducers in the Pulp and Paper Industry," by James A. Porter, of W. A. Jones Foundry and Machine Co.

◆ Plant of American Cyanamid Burned

The dry rosin size plant of the American Cyanamid & Chemical Corporation at Valdosta, Ga., was severely damaged by fire November 11. The fire was caused by a short circuit.

The plant will be rebuilt immediately on a considerably enlarged scale, due to the ever growing demand for dry rosin size from the paper and pulp manufacturers. During building operations at Valdosta, there will be no interruption of service whatsoever as shipments of dry rosin size will be made from two other plants of the American Cyanamid & Chemical Corporation.

◆ THROND THOMPSON, formerly assistant plant manager of the Sefton Division of Container Corp of America, Chicago, has been assigned to the company's Coated Board Division, Chicago, as plant manager for general rehabilitation work.

◆ New Catalogues and Publications

Bailey Meter Co., Cleveland, Ohio—Bulletin, No. 300, describes the new line of Bailey Fluid Meters and illustrates the several types of meters that can be furnished. It also points out the distinctive features which make this line of meters outstanding. Other sections of the bulletin deal with the application and methods of installation of the equipment. There are numerous illustrations comprising detailed drawings, diagrammatic sketches, equipment photographs, installations photos, and chart reproductions in four colors.

Grasselli Chemical Co., Cleveland, Ohio—A folder called "Silicate of Soda, Its Uses," has been prepared by this company and is available to anyone interested. It contains a lot of detailed information in regard to the proper grade of Silicate of Soda to use for various purposes.

Metropolitan Life Ins. Co., One Madison Ave., New York—An outline of some of the credit and collection policies and practices which have been employed effectively by manufacturers and wholesalers is given in a new report entitled "Effective Credit Management" published by the Policyholders Service Bureau of this company. The information is set forth in factual form with the thought that the methods described may be of value to business men in dealing with their own credit problems. A limited number of copies are available for distribution to credit executives and others interested in this problem.

Philadelphia Quartz Company, Philadelphia—A rather unusual booklet has been published by this company in which is set forth a condensed story of silicates of soda and their applications. Manufacturing methods, properties and analysis are outlined, and sections are devoted to a list of present brands available and the uses of silicates of soda. Shipping information is also included.

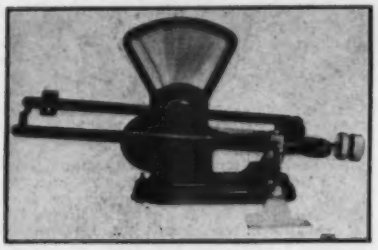
BOOKS

Industrial Management in this Machine Age is the title of a recently published book on the interesting and important subject suggested by the title. Francis A. Westbrook, the author, is a graduate engineer with a varied industrial experience and one who has written extensively for a number of engineering and industrial publications. In this book on industrial management, the illustration method of presentation is used as is a style that can be readily understood by a non-technical reader. A number of well-known industrial concerns are cited to emphasize certain phases of management problems and accomplishments. The book contains a little over 400 pages of material that is printed in good, legible type. It is published by Thomas Y. Crowell, 393 Fourth Avenue, New York City. Price $3.50 per copy.

Handbook of Industrial Temperature and Humidity Measurement and Control, comprising in one volume parts 2 and 3 of "The Manual of Instrumentation" by M. F. Behar, is a self-contained handbook that has been published to be used without reference to the other parts of the manual. Part 2 includes chapters covering temperature information of a general character, indicating thermometers, pyrometers, temperature recorders, automatic temperature control, and temperature control instruments and accessories. Part 3 includes chapters dealing with humidity measurement and control, with one chapter on humidity and aerological measuring instruments. The book, technical in character and emphasizing fundamental considerations, should be of interest to any one that is technically minded and associated with operations involving either temperature or humidity control, or both. The price of the book, published by The Instruments Publishing Company, Pittsburgh, Pa., is $4.00.

◆ Toledo Variation Auto-Gage

Toledo Precision Devices, Inc., has developed the Toledo Variation Auto-Gage for measuring and indicating the increase or loss of any physical property in any material. Increases or decreases



in elasticity, specific gravity or moisture are reported to be quickly shown.

This device can be furnished with any chart needed, with calibrations in per cent, elasticity, specific gravity, pounds and ounces. Any special commodity container can be supplied. The weight of the containers used can be tared out. Two sizes are available: For samples from two ounces to three pounds and for samples from four ounces to six pounds. In some cases, no samples are necessary as the operation is carried out by a weight submerged in the liquid to be tested. For such operations, any weight desired to be suspended in a liquid can be furnished.

Complete details can be secured on application to Toledo Precision Devices, Inc., Toledo, Ohio.

◆ New Compound Makes Rubber Tubing and Hose Oil-Proof

Due to the development of a new compound named Paranite G. O. P. (gas-oil-proof) by The Manhattan Rubber Mfg. Division, Passaic, N. J., it is said that it is now possible to produce rubber tubing and hose that is entirely unaffected by petroleum derivatives.

The Paranite G. O. P. compound is reported to be a special substance similar to rubber in appearance and physical characteristics. The base compound is a refined hydrocarbon sulphide known by the trade name of Thiocol. The hose is lined with the G. O. P. compound either in pure form or combined with oil-resisting rubber in the right amounts, depending on the severity of the service.

◆ New Recording Hygrometer

A new recording hygrometer, known as the humidigraph, has been placed on the market by the Bristol Company, Waterbury, Conn.

This instrument consists essentially of two thermometers: one dry, reading the temperature of the air directly; and the other wet, having its mercury bulb covered with a wick, saturated with distilled water. It utilizes as the actuating and measuring element a unique vapor sensitive or hygroscopic device that essentially consists of sensitive wood fibers built up on a nickeled wire screen wound in the form of a spiral. As changes in the relative humidity occur, they affect the hygroscopic element, creating a deformation that causes the free end to move or revolve about the longitudinal central axis of the spiral. This movement or rotation is transferred by means of a simple linkage to the pen arm, which in turn continuously traces an ink record of relative humidity on the chart.

Literature giving interesting details of construction and application is obtainable from the manufacturer.

◆ Lunkenheimer Bottle Oiler

The Lunkenheimer Company is marketing a new design of bottle oiler. As shown in the illustration, the oiler is made up of three major parts: a glass bottle with threaded neck, bronze base with integral sleeve type shank, and brass feed wire. A cork washer seals the joint between bottle and base.

This type of oiler is said to supply the correct amount of oil for most efficient

and economical lubrication of plain bearings. It is entirely automatic in operation, feeding only when the shaft is in motion. Oil wastage and time lost incident to hand oiling are eliminated.

Complete details of oiler are given in booklet No. 532, which is available upon request to The Lunkenheimer Co., Cincinnati, Ohio.

◆ Ryerson Features New Bearing

Joseph T. Ryerson & Son, Inc., have announced a new bearing made from synthetic resin similar to Bakelite and with textile material as the base. The strong belting textile material reinforces the resinoid, which completely fills and saturates it. The composite material is then subjected to great heat and pressure. At approximately one ton pressure per square inch and 340 deg. Fahr., the product sets.

The physical characteristics are entirely changed and the bearing is no longer fusible or soluble. It cannot be re-softened by heat, will not absorb water or oil and is resistant to most acids. It is, however, attacked by hot caustic alkalies.

Ryertex, which is the name of this new product, is extremely hard and will show a Brinell reading of about 30-40 and a Sclerescope reading of 70-80. Actual service tests have shown that Ryertex bearings will outlast babbitt and bronze applications from four to ten times. They are particularly satisfactory in cases where it is easier to apply water as a lubricant than oil, though they will operate satisfactorily with oil.

◆ New Mason Regulator Control System

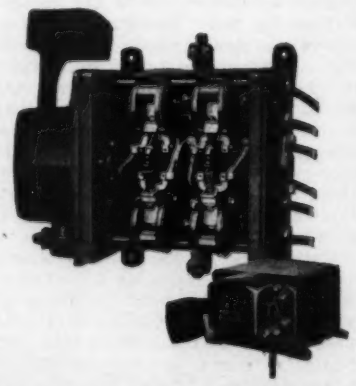
A distinctive new differential draft control system has been perfected by the Mason Regulator Co. This new controller is of the instrument type and regulates the amount of air passing through the furnace in accordance with the natural draft of the stack and also the quantity of fuel consumed. In order

to accomplish this, the Mason instrument controls the feed of forced, or induced draft blowers, the inlet, up-take or stack dampers, or any other suitable means for controlling the flow of air to the furnaces. Like most other temperature and pressure control instruments, this new draft control instrument is operated by compressed air.

Descriptive literature of this system may be obtained from the Mason Regulator Co., 1190 Adams St., Boston, Mass.

◆ A New Small Limit Stop

A new, small-size, crane limit safety stop, with standard mill type blowouts and contact tips, has been developed by Cutler-Hammer, Inc., Milwaukee, Wis.



These stops are used to prevent over-travel of the hoist on electric cranes.

Rated for 40 hp. and under, it is claimed the new stop is unusually small and compact for this rating, taking only 9-inch head room. The stop is supplied complete with leads equipped with soldering lugs. The cover is removable for inspections and repairs.

POWER

GENERATION + UTILIZATION + MAINTENANCE

This section turns the searchlight on power and its allied problems, showing big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worth while practices suggest new ideas and wider usages of equipment.

By W. S. JOULE

◆ Combating Ice in Waterpower Plants

At this time of the year, the operating men in waterpower plants are looking forward to another battle with old man winter. Ice may cause considerable trouble and it may be necessary to take certain precautions with sluice gates, flash boards, rack bars, head gates, penstocks, surge tanks and water wheels.

To keep the face of a sluice gate free from ice, it is desirable to enclose it on the back with wooden sheathing or by light steel plates with heat-insulating material on the inner surface. The steel plates are less likely to be pulled off by ice that forms on the back of the gate. Electric heaters are often the most convenient. A continuous power input of 60 watts per square foot of gate surface is sufficient to keep a gate free under most severe climatic conditions.

To keep roller trains free from ice, it is customary to install a heater, in a suitable compartment such as in an embedded pipe, adjacent to the roller train on the side opposite the headgate. These heaters should be of 4 or 5 kw. capacity each. A design in which the roller trains are housed in as completely as possible is advisable, not only to keep out trash and prevent displacement of the roller train, but also to prevent excessive heat loss.

Where steam is available, it may be used for thawing sluice gates. At one power plant two 20x40-ft. gates are kept free by the application of steam once a day. At this plant, a gate was also kept clear of ice on the front by means of compressed air. A compressor driven by a 1¼-hp. motor was installed on the dam adjacent to the gate and an air hose connection was made with a horizontal perforated pipe attached to the face of the gate 12 feet below the surface. With such an arrangement, it is necessary to use steam or other form of heat to thaw the roller trains and gate sill.

Where it is not possible or desirable to hold the pond level constant, it is necessary to prevent the ice freezing to the flashboards. This can be done with compressed air as in the case of the sluice gate previously mentioned, or a trench can be opened by hand and covered with boards. Sufficient heat can be applied inside this covering to keep the trench from freezing over. Electric lights are often used for this purpose.

Rack heating is being done successfully by electrical means. Rack bars are insulated by hardwood strips connected together in a suitable series-parallel arrangement. Wood insulation has been found to be quite satisfactory for potentials up to 220 volts, there having been no failures at one plant after several years operation.

Headgates, being fairly well protected from freezing on the back, are not so subject to frost action as sluice gates. When covered by a heated gate house, they may not require any local heating. However, if frost can strike through from the outside, ice may form in the gate slots, or may freeze up the vents behind the gates. Warm air blown down on the surface of the water, radiant electric heaters with reflectors to throw the heat where desired, and immersion electric heaters are all being used successfully to keep headgates in operating condition in cold weather.

Steel penstocks may be operated under severe climatic conditions without a protective covering if certain precautions are taken. A coating of ice forms in cold weather on the inside of the penstock to a depth depending on the temperature and the velocity of the water. When the turbine is shut down for any length of time, the headgate should be closed and the penstock drained to prevent its freezing solidly. During a thaw, the ice coating is apt to loosen and come down into the turbine, shutting off the flow of water and reducing the power output of the unit. Usually after a few hours operation the ice clears out and the unit gradually picks up full load. It is inadvisable to unwater a penstock at such a time, as the ice might come down the empty penstock with great velocity and endanger any workman in the wheel casing or damage the turbine itself.

Surge tanks should be well lagged to keep out frost. In some cases, electric heaters are installed between the lagging and the steel tank.

In some locations, trouble is experienced from ice adhering to the guide vanes and the operating mechanism of the turbines and sometimes to the runners as well. In one plant, this trouble is combatted by shutting down a unit at intervals, unwatering the wheel case, and turning in steam for a short time.

◆ A MACHINERY slush to keep bright parts from rusting can be made as follows: Melt 1 lb. of lard and dissolve in it 1 oz. of camphor. Remove the scum that will rise, and stir in enough powdered graphite to give the mixture the color of iron. Clean the surfaces to be protected thoroughly and smear them over with the compound. After 24 hours or more, wipe the surfaces clean with a soft cloth. Under ordinary conditions, surfaces so treated should keep bright for several months.

◆ Rules for Low-Pressure Boiler Operation

Engineers operating low pressure heating boilers will find of interest the following rules compiled in a recent issue of *The Superintendent:*

1—Blow out the water column and gauge glass and try gauge cock before starting fire in the morning. Do this several times a day.

2—Try safety valve and if found out of order report it.

3—If sediment or sludge gathers in the boilers, blow the boilers through the bottom blow-off. Open the blow-off valves slowly and carefully, leaving them open three or four seconds, and close them the same way. Do not jerk the valves or open them suddenly.

4—When shutting off steam lines, shut the return valves first, then close the steam valves. There may be check valves in the line but do not depend on them. The reason for this rule is that if the steam valve is closed first, the condensing steam causing a vacuum will draw the water out of the boiler into piping and radiators.

5—Clean the flues with a good scraper at least every other day.

6—If damper regulators are used, shut them off at night.

7—Shut off the water glass at night.

8—When cutting in a new boiler on a battery, have the pressure the same on all boilers, and then open the main stop valve very slowly.

◆ A FORMULA for making belt cement is as follows: Take 1 lb. any standard belt glue, or 1 lb. of good white glue, and add 1 oz. of powdered white lead. Mix with water to the consistency of ordinary glue. Just before using, thin down with alcohol, apply hot and press the ends together until well set. This is especially valuable for the scarfed ends of leather belts. Another mixture for cementing the scarfed ends of leather belts is: Gutta percha, 1 lb.; crude rubber, 4 oz.; linseed oil, 2 oz.; pitch, 2 oz.; and shellac, 1 oz. Melt and apply hot.

◆ BOILED LINSEED OIL is sometimes used on rubber belts to restore pulley adhesion. It is applied on the pulley side of the belt with a woolen cloth.

The MONTH at WASHINGTON

THE BUSINESS SITUATION—After showing a decided upward trend, pending elections and following the election, business has shown a marked trend to mark time. Wholesale prices have advanced and receded spasmodically. The volume of industrial output, after increasing considerably during August and September, remained unchanged in October, and showed a falling off if anything in November. Factory employment and payrolls showed some increase. Advance in business is noted in some foreign countries, with exports from this country showing some expansion. Plants and labor on a five-day week basis is showing a gradual increase, with establishments on short time more than doubling in the past year. Manufacturers are adopting the plan to a much larger extent than are other business activities. Improvement in Germany shows a gradual continuance, despite the unsettled political situation.

Interstate Commerce Ruling—In Continental Paper & Bag Mills Corp., vs. Atlantic City R. R., No. 19517, upon further hearing, the Interstate Commerce Commission determined the amount of reparation due on shipments of paper bags, in straight carloads and in mixed carloads with wrapping paper, from Rumford, Me., to Newark, N. J., and Philadelphia and Harrisburg, Pa. The fifth-class proportional rate and the sixth-class rates were drawn into question.

Achievements of Trade Promotion Bureau—Business valued at more than $47,000,000 was reported by U. S. Exporters to the Bureau of Foreign and Domestic Commerce as direct results of the trade promotional activities of that organization, according to the annual report just issued. Thousands of inquiries are received each week on commodities, problems of commercial laws, international finance and investment, foreign construction, foreign tariffs, etc. The report recites a number of specific examples of results obtained through the trade promotion efforts of the Bureau.

The report also emphasizes the fact that the Nation has always moved forward after each depression with renewed vigor and determination to new heights of accomplishment, and urges business and industry to remember the painful lessons of the last three years and to profit by them.

Writing Down Corporate Values—The movement is noted of writing down corporate values by the Treasury Department, the development being described as indicating an emergence from the depression, such action said to be bettering the position of these concerns. The record discloses that similar procedure has followed former periods of business recession.

The purpose of the action on the part of those corporations that have already completed this readjustment was explained as a recognition of opportunities to place the individual firm in a stronger position for the future, meanwhile reducing some of the charges incident to carrying higher book values. Tax burdens are thus lightened, depreciation ratios are automatically changed, and insurance costs reduced.

Causes of Bankruptcy—In an analysis of a number of cases by the Department of Commerce, a published report of a recent survey shows the principal causes of bankruptcies due to inefficient management and unwise credit granting, with the personal element an important factor, and with the depression wielding but a negligible influence yet tending to accentuate the causes. The survey shows an unjustified entrance into business as largely responsible for a majority of commercial bankruptcies in a recorded loss of seven billion.

The Fifteenth Census—The largest tabulation in history has been finished in record time, says the Census Bureau, which is now completing the fifteenth annual census, the most comprehensive ever undertaken by any country, and detailed statistics were published earlier than in any previous enumeration.

American plants turned out 4,409,344 tons of wood pulp worth $156,174,967 in 1931, a decrease of only 4.8 per cent in quantity, but of 18.8 per cent in value from the 1930 figures. In addition 69,849 tons of pulp were made of materials other than wood. The 196 establishments reporting, operated 203 mills. In 1929 there were 198 establishments. The number of wage earners declined from 24,729 in 1929 to 20,218 last year, or a decrease of 18.2 per cent. Wages fell 31 per cent. The cost of materials, fuel and purchased electric energy was off 25.6 per cent.

New Regulation for All Transportation—Creation of a new government agency, to be known as the Bureau of Transportation for the purpose of extending Federal regulation to all forms of transportation, is being proposed in legislative circles. The Bureau would function under the guidence of a single director and would be composed of the Interstate Commerce Commission, the Shipping Board and the Aeronautics Branch of the Department of Commerce. Motor transportation when legislated into being would also fall under the jurisdiction of the Bureau.

Litigation—A decision handed down in the U. S. District Court at Wilmington, Del., (Equity No. 871), in Masonite Corp. vs. The Celotex Co., holds that a patent on board made from fiber is limited to wood products, and that material manufactured from waste of sugar mills known as Bagasse is not an infringement of patent claims.

Paper Notes of Interest—Following Finland's refusal to join a projected newsprint control union, recent attempts toward an organized curtailment of newsprint production in the three northern European countries, Norway, Denmark, Sweden, seem to have failed.

Sales of Japanese paper during the first eight months of this year were 433,816 tons as compared with 433,471 tons for the same period last year.

Freight Investigation Into Newsprint Rates—The Interstate Commerce Commission has reopened the freight investigation into newsprint rates to bring the proceedings up to date in view of changed economic conditions, involving the freight rates on newsprint in Western Trunk Line territory and the entire area east of the Mississippi.

New Types of Paper Testing Equipment—As the result of recent work at the Bureau of Standards, three new instruments have been made available for testing papers—one for measuring water resistance, another for measuring the opposite quality of absorptiveness, and a third for removing coating from paper so that the paper base can be inspected and tested.

The Bureau also reports that the serviceability of binders board can be evaluated satisfactorily by measurement of thickness, density and flexural strength properties, as a result of experimental testing of this material done at the request of the Binders Board Manufacturers Asociation and with their assistance.

Rubber cement as an adhesive for paper is the subject of another report from the Bureau, showing that this cement is sometimes used in public libraries to fasten papers containing valuable records in scrap books and other protective holders and appears to be very convenient and generally suitable adhesive for this purpose.

As a part of its testing of 229 old books, that had been stored in various public libraries, the Bureau has found, as in the case of old newspapers, that the papers containing the purer fibers were in better condition. The papers were composed of rag, straw and wood fibers, either alone or in mixtures.

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◆ Dr. Langmuir Awarded Nobel Prize

The Nobel Award in Chemistry for 1932, the greatest recognition that any scientist can receive, has just been presented to Dr. Irving Langmuir, associate director of the General Electric Research Laboratory.

Dr. Langmuir has been connected with the research staff of the General Electric Company since 1909. He is a past president of the American Chemical Society, a member of various scientific societies, and has received numerous honorary degrees. Dr. Langmuir has won a number of previous honors in chemical research.

+ CANADIAN NEWS +

◆ Newsprint Conferences Being Continued

Further meetings have been held in Montreal between representatives of the leading newsprint companies and the banking interests in an endeavor to arrive at some working basis following the crisis in the newsprint industry caused by the price war now on. At one time during the past month, the situation reached a point where it was thought it might be advisable to suspend further meetings, but it was finally decided to meet again to attempt to solve the problems of the industry.

It is understood that a pooling agreement in regard to the larger companies is proposed, but there is stubborn opposition to the plan, and its ultimate fate depends upon the unanimous vote of all concerned. Some members advanced the plan in order to give stability to the contract field. Others disagreed on the theory that those who had profited by the switching of contracts would be given relatively more advantage by pooling plans which would still further reduce operations of companies which had suffered reverses in the open season for contracts.

It has been announced that there is agreement on the principle of a pooling arrangement, and that all that remains is to settle terms and other details incidental to the individual contributions to the pool.

◆ NEARLY FOUR HUNDRED tons of paper machinery recently left Bury, Lancashire, for shipment to Newfoundland, part of an order which Charles Walmsley and Co. are completing for the Anglo-Newfoundland Development Co. The contract, which is valued at £90,000, was secured in the face of strong competition. When assembled, the machine will be capable of producing 120 tons of newsprint per day and is designed to operate at a maximum speed of 1,200 feet a minute.

◆ DURING THE MONTH of October, production of Canadian newsprint mills amounted to 157,506 tons, as compared with 150,691 tons in September and 184,252 tons in the corresponding month of last year. The corresponding figures for shipments were 157,568 tons, 152,633 tons and 191,785 tons, respectively. Canadian production in the first ten months of 1932 was 1,609,090 tons, against 1,876,982 tons in the first ten months of 1931, a decrease of 267,892 tons, or 14.3 per cent.

◆ Possibilities of Empire Preference

While, as previously stated, there was very little in the agreements of the recent Imperial Conference at Ottawa affecting the pulp and paper industry of this country, the fact that the British Government agreed to continue to accord free entry to Britain on many lines of manufacture, while continuing to impose duties on similar manufactures from outside the Empire, offers some opportunities to the Canadian paper industry that may in time prove to be important.

Admitted free, as against a 25 per cent ad valorem duty on foreign products, are kraft and imitation kraft, machine-glazed paper (other than bleached white poster); greaseproof paper; certain glazed paper; all weighing from 7 to 90 lbs. to the ream of 480 sheets of double crown, 30 by 20 in.

Admitted free, as against 20 per cent ad valorem duty against foreign products, are paper and board (other than newsprint) weighing up to 90 lb. per ream of 480 sheets double crown, 30 by 20 in. When of a heavier class, the foregoing are admitted free as against a duty on foreign products of 15 per cent ad valorem.

QUEBEC

◆ Canadian Subsidiaries of I. P. Co. Make Report

Gatineau Power Co. and subsidiary companies report increases in both gross and net earnings in the third quarter of this year over the corresponding quarter of last year. Consolidated total gross revenue, including other income, was $2,224,440, as compared with $2,176,053 in the third quarter of 1931; net revenue available for interest and depreciation was $1,939,540, against $1,857,744; and balance added to surplus was $456,648, compared with $334,993.

Canadian Hydro-Electric Corp., and subsidiary companies, including Gatineau Power Co., report that consolidated total gross revenue, including other income, for the third quarter of this year was $2,288,145, compared with $2,260,769 in the third quarter of 1931. After deducting all prior charges the amount available for dividends in the third quarter was $522,346, against $453,384 in the corresponding quarter of 1931, and balance added to surplus was $334,846, compared with $265,884. For the twelve months ended September 30 consolidated net revenue available for dividends was $2,785,538, or $22.28 a share on the 6 per cent first preferred stock, compared with $2,018,296, or $16.15 a share, in the twelve months ended September 30, 1931.

A conference took place recently between Premier Taschereau and Brigadier-General J. B. White, vice-president of Canadian International Paper Co., regarding the operations of the latter in the lower part of Quebec, and the situation of the colonists of the Gaspé Peninsula. According to a statement made by the Premier the government has asked the company to purchase the pulpwood of the Gaspé colonists, to help the latter to pass through the present crisis, made the more acute because of the damage incurred during the storm which recently swept that district. The subject will be taken up at a conference to be held in Quebec shortly.

◆ Price Bros. Operating at a Loss

An interim financial and income statement on Price Bros. and Co., covering the seven months ended September 30, 1932, shows an operating loss of $429,692 after all charges (not including depreciation, depletion and sinking fund). The balance sheet shows that current assets declined from $6,664,030 to $5,985,358, while current liabilities have dropped from $6,570,774 to $6,313,118.

The failure of Price Bros. to meet interest payment on its bonds at the expiration of the 90 days' grace period allowed under the trust deed renders uncertain the status of the Duke Price Power Co.'s power contract with the newsprint company. Of the 350,000 horsepower total contracts held by Duke Price Power, Price Bros. had contracts to use 100,000 hp., including 40,000 hp. under a 50-year contract and 60,000 hp. under a 10-year contract. Duke Price Power Co. is controlled by the Aluminum Co. of Canada, a subsidiary of Aluminum, Ltd.

◆ G. C. PICHE, chief of the Quebec forestry services, stated last month that it is estimated that this season's pulpwood cut in the province would be in the vicinity of 800,000,000 feet and the sawed lumber cut 125,000,000 feet board measure. If those figures stand through the winter, the cut will be greater by 100,000,000 feet than during the previous winter.

◆ CHICOUTIMI Mills, Ltd., of Chicoutimi, was recently granted a provincial charter to do business as dealers, manufacturers, etc., in mechanical pulp, sulphite pulp, wood, papers, paper materials, cardboard, strawboard, etc., with a capital stock of $100,000. Among the incorporators are Alfred J. Martin, Francis J. Bush and Joseph T. Harrington, of Montreal.

ONTARIO

◆ Liquidator for Abitibi

The Master of the Supreme Court at Osgoode Hall, Toronto, decided last month that the interests of all parties concerned would be best served by naming F. C. Clarkson permanent liquidator of the Abitibi Power and Paper Co. Mr. Clarkson is a brother of G. T. Clarkson, receiver for the company.

The committee looking after the affairs of the bond holders of Abitibi Power and Paper has circularized the shareholders appealing for additional deposits of bonds in order to strengthen the committee's position as adviser in connection with many operating prob-

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Figure 1914
Screwed End Y Valve
Sizes ¼" to 3"

Figure 1945
Screwed End Gate Valve
Sizes ¼" to 3"

Figure 1916
Screwed End Check Valve
Sizes ¼" to 3"

Figure 1912
Screwed End Globe Valve
Sizes ¼" to 3"

Figure 1451
Flanged End Gate Valve
Sizes 2" to 24"

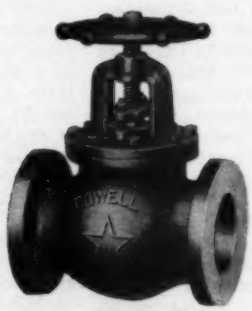

Figure 457
Flanged End Globe Valve
Sizes 2" to 12"

Figure 1453
Flanged End Gate Valve
Sizes 2" to 30"

POWELL VALVES

lems presented by the receivership, as well as to take part in negotiations which must at a suitable time be conducted on behalf of the bondholders in working out a plan of reorganization. It is stated that the receiver is operating the properties and directing every efforts toward curtailing the company's expenditures and the reduction of its costs to strengthen its competitive position.

The committee has announced that over half of the 5 per cent first mortgage gold bonds, Series A, have been deposited with it.

Abitibi Power and Paper Co. at Sault Ste. Marie will pay taxes on an assessment of $1,960,000 next year, the court of revision of that town has decided. This is $310,000 less than the original assessment. The assessment next year will be an increase of $540,000 over 1932.

◆ MANCHESTER, McGregor, Ltd., Toronto, have installed new equipment for the manufacture of folding boxes, in addition to their regular lines of set up boxes, and went into production at the end of October. The company was formerly the Regal Paper Box Co., and is one of the older paper box making organizations in Toronto.

◆ A NUMBER of the paper mills in the Niagara Peninsula are contemplating the installation of electric boilers. A co-operative movement along that line is taking place and negotiations will likely result in the substitution of "white" coal for black in the boiler rooms of various mills in that district.

◆ Reorganization of Firstbrook Boxes

Working out of a plan of reorganization of Firstbrook Boxes, Ltd., Toronto, has now been completed, involving the sale of its assets and revamping the capital structure. Shareholders are being asked to approve measures for sale and disposal by the receiver of all property and assets comprised in the trust deed and mortgage covering the bonds, and in accordance with the terms of an offer made by the Robert Gair Co.

The plan provides for the incorporation of a new company with an authorized capital of 2,000 preference shares of $100 par, and 100,000 common shares of no par value. The new company will purchase all of the assets of the existing company, will assume the bank indebtedness, will issue new bonds to and from the old bondholders on an equal basis as regards principal and interest, and will issue to and for the benefit of all creditors of the old company whose claims exceed $1,000 non-voting preference shares of the new company of a par value equal to the respective claims.

The Robert Gair Co. is to sell to the new company certain machinery of a value of approximately $73,000 in consideration of the issue to it of 72,165 new common shares. The new company will issue to the shareholders of the old company five new common shares for each old preference share and one new common share for each twenty old common shares. The new company is to pay the costs of reorganization.

◆ Hinde and Dauch Expands Its Field of Activity

Simultaneously with the closing down of the Canadian Paperboard Co.'s Toronto plant at the middle of November came the official announcement that the Hinde and Dauch Paper Co. of Canada, Toronto, manufacturers of jute, chip and container board and solid fiber and corrugated boxes had extended its mill service to include all general grades of boxboards.

For the past month, the company has been revamping the equipment of its Toronto mill in order to make it suitable in every way for the production of boxboard grades. It was also announced that F. F. Arnoldi, late of the Canadian Paperboard Co.'s staff, had been appointed sales manager.

The five-cylinder machine in the No. 1 Toronto mill, which has been turned over to the manufacture of boxboard grades, is now in production with an estimated daily capacity of 45 to 50 tons. The production of the Toronto plants had hitherto consisted of solid fiber and corrugated shipping cases, corrugated and solid fiber sheets, pads, partitions and roll stocks, container boards and test liners, chip boards, mill boards, backing boards and boxboards. The company also operates box factories at Montreal and Trenton, Ont., straw paper being manufactured at the latter point.

◆ NOVEMBER 28 marked the opening of the new factory and office building built by the Kotex Co. of Canada to supply the domestic market and the United Kingdom. Construction of the new plant was started on June 24 and work was given to an average of 60 men a day from that date until the structure was completed.

◆ THE MINISTER of Lands and Forests of Ontario has acceded to the request put forward by the Fort Frances Pulp and Paper Co. for a reduction of dues on pulpwood from $1.40 to $1. This reduction is good for this season only and will be limited to a definite quantity of pulpwood cutting. Relief of some unemployment was the reason given for the reduction in rates.

◆ WALTER CRAWFORD has been appointed mill manager at the plant of Dominion Boxboards, Ltd., Toronto, and has entered upon his duties. He was formerly with the Sutherland Paper Co., Kalamazoo, Mich.

BRITISH COLUMBIA

◆ ALTHOUGH pulp markets continue depressed, Lawrence W. Killam, president of British Columbia Pulp and Paper Co., has announced that the company will have both its mills, which have been closed down since last May, operating this winter. "Re-opening of our mills at this time does not mean that we have found a substantial improvement in the market," said Mr. Killam. "We recognize the importance of keeping industry moving, however, and of maintaining employment. We have been selling from stored stock since early in the summer, and we still have some stocks left."

◆ THE COUNCIL of Fernie has gone on record as endorsing the proposal of the Flathead Paper Co. to build a pulp and paper mill at that place. They have asked federal and provincial governments to support the proposition by guaranteeing the interest on a $500,000 bond issue at the rate of 5½ per cent for a period of ten years.

NEW BRUNSWICK

◆ PORT ROYAL Pulp and Paper Co., operating the plant formerly owned by the Nashwaak Pulp and Paper Co., at Saint John, is now in operation with a staff of some 140 employees on the pay roll. The management has stated that there are orders on hand for the New England markets which justify operations, and it is expected that the output will reach normal.

◆ IN ORDER to help relieve unemploymentin rural districts, Fraser Companies are using hardwood instead of coal in the boilers of their pulp and paper mill at Edmundston. The plant was originally equipped with burners to utilize the waste and shavings from the planers of the lumber plant, and this equipment is available for burning the hardwood now being purchased. The steam costs of the plant with the changed fuel will be the same as when Nova Scotia coal was being burned.

❖ ❖ ❖

◆ Duriron Gets U. S. Rights to Pansl Strainer

The exclusive manufacturing and sales rights for the United States for the patented Pansl Strainer for pulp digesters is being announced by The Duriron Company, Inc., Dayton, Ohio.

The strainer is made in the form of a ring that fits between the digester body and cover, becoming a permanent attachment. Relief lines are connected directly to the strainer so that no connections have to be broken to remove the cover for loading the digester, and no openings have to be made in the digester shell or lining. Claims made for it are that the strainer cannot become clogged with chips, loading time and labor costs are reduced, and that the positive relief makes for better results in the digester.

The strainer is being made in sulphite-resisting alloy steels of low carbon content (below .07 per cent) and will be made in other alloys if desired.

◆ JAMES M. FERRIS, secretary and treasurer of The Sandy Hill Iron & Brass Works, Hudson Falls, N. Y., passed away November 2. Mr. Ferris was widely known throughout the industry.

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◆ Annual Meeting of Paperboard Industries Association

The annual meeting of the Paperboard Industries Association was held at the Commodore Hotel, New York City, November 17. Separate meetings of the Paperboard, Container and Folding Box Groups were held on the 16th. At these meetings, the following officers were elected for the ensuing year: President and Chairman of Executive Committee, George R. Browder, Chicago; Vice President Paperboard Group, Wesley M. Dixon, Container Corp. of America, Chicago; Vice President Container Group, M. M. Madson, C. F. Downey Box Co., No. Kansas City, Mo.; Chairman Folding Box Group, John L. Barchard, Hummel & Downing Co., Milwaukee, Wis.

At the meeting of the Paperboard Group, Warren B. Bullock, Manager of the Import Committee of the American Paper Industry addressed the meeting briefly regarding the import tariff situation and possible changes in import tariff duties. His presentation was instructive and was well received.

At the general meeting of all groups, Retiring President Henry D. Schmidt addressed the members regarding developments in connection with a regrouping of the Association. He reported that at a series of meetings November 16, the Western Paperboard Group (composed of manufacturers of set-up and folding boxboard) and the Eastern Paper Board Exchange (also composed of manufacturers of set-up and folding boxboard) elected to come into the Paperboard Industries Association as separate units or divisions of the Association. He also stated that following a meeting on the same day of container-board mills, both east and west, this group, as a unit had also applied for admission as a group of the Association. The Container Group of the Association has under active consideration a plan of reorganization of the present group and a special committee is endeavoring to develop a plan which will insure the hearty co-operation of the entire container industry. Conferences are still in progress and word is awaited as to the final outcome.

President Schmidt made several recommendations for effecting the regrouping of the Association which were put before the meeting, approved and unanimously carried.

The annual dinner of the Association was held in the West Ballroom of the Hotel with 144 in attendance. This was the largest gathering that has attended any of the annual dinners.

◆ A New Industry—Manufacture of Sound Absorbing Materials

The Bureau of Standards in a recent Technical News Bulletin, calls attention to the rapid development in the manufacture of sound-absorbing materials for use in correcting the acoustic quality of auditoriums. This should be of interest to manufacturers of fiber board because this product is one of the important materials used for this purpose. The following statements are made concerning the growth of the industry and of the Bureau's facilities for meeting its requests for service.

Though the underlying principles of architectural acoustics have been known for nearly 40 years, the subject attracted but little attention from those who should have been interested until the introduction of talking pictures. It was then found that many theaters which had been built for silent pictures were acoustically almost useless. This discovery stimulated the study of means for correcting the difficulty and directed attention to such sound-absorbing materials as were then available.

These materials were limited in number, and some of them were serious fire risks. Development of new materials to meet the demand brought requests for service in the measurement of their sound absorption.

In 1928 the facilities for this work were limited to two laboratories, both in the State of Illinois. In the fall of 1928 the Bureau of Standards completed a reverberation room for making such tests and placed it in service.

In 1929, seven different firms sent material for measurement, and this number was increased to 18 in 1930 and 23 in 1931, in which year the total number of samples measured was 97. For the first half of 1932 the demand for service of this character has been in excess of the 1931 rate.

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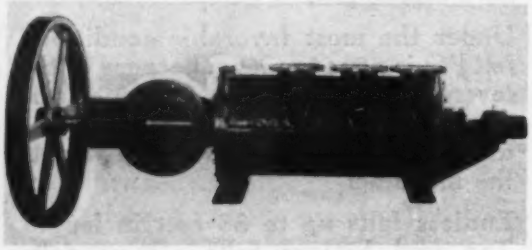

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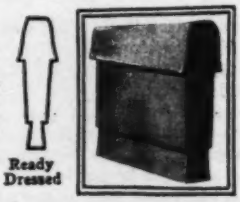

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July 1, 1932, to June 30, 1933

Scores as of October 31, 1932

25 Mills Keep Perfect Record

PERFECT SCORES

Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
GROUP A	Hollingsworth & Whitney Co.	Algonquin & Taconnet Paper No. 2	Winslow, Me.
	Champion Coated Paper Co.		Hamilton, Ohio
GROUP B	Champion Coated Paper Co.	Paper No. 1	Hamilton, Ohio
	Bathurst Power & Paper Co.	Bathurst	New Brunswick
	Consolidated Water Power & Paper Co.	Wisconsin Rapids	Wisconsin
	Fraser Companies, Ltd.	Fraser Paper, Ltd.	Madawaska, Me.
	St. Croix Paper Co.	Woodland	Maine
GROUP C	Container Corp. of America	Cincinnati	Ohio
	Ticonderoga Pulp & Paper Co.	Ticonderoga	New York
	Marinette & Menominee Paper Co.	Menominee	Michigan
	Consolidated Water Power & Paper Co.	Appleton	Wisconsin
	Cornell Wood Products Co.	Cornell	Wisconsin
	Consolidated Water Power & Paper Co.	Biron	Wisconsin
GROUP D	Port Huron Sulphite & Paper Co.	Sulphite	Port Huron, Mich.
	U. S. Gypsum Co.	No. Kansas City	Missouri
	U. S. Envelope Co.	Morgan Paper Div.	Litita, Pa.
	International Paper Co.	Livermore Falls	Maine
	Container Corp. of America	Carthage	Indiana
	International Paper Co.	Riley	Maine
	U. S. Gypsum Co.	Gypsum	Ohio
	Hollingsworth & Whitney Co.	Abenaquis	Madison, Me.

Division II—Remanufacturing

Consolidated Water Power & Paper Co.	Stevens Point	Wisconsin
Kimberly-Clark Corp.	Atlas	Appleton, Wis.
Container Corp. of America	Natick	Massachusetts
Bemis Bro. Bag Co.	E. Pepperell	Massachusetts

IMPERFECT SCORES—Division I

	Key	Rank	Points Credit	Points Debit
GROUP A	PA-11	3	868.912	
	PA-12	4	834.528	
	PA- 3	5	827.248	
	PA- 6	6	783.504	
	PA- 4	7	717.728	
	PA- 7	8	529.136	
	PA-10	9	489.488	
	PA-13	10	467.216	
	PA-14	11	452.704	
	PA- 9	12	319.488	
	PA- 8	13		5,419.120
	PA- 5	14		8,973.104
GROUP B	PB- 7	6	891.760	
	PB-14	7	870.640	
	PB-21	8	860.584	
	PB-22	9	718.736	
	PB-17	10	679.536	
	PB-18	11	654.480	
	PB-20	12	531.152	
	PB-19	13	491.312	
	PB-16	14	475.856	
	PB- 3	15	466.864	
	PB- 8	16	239.120	
	PB-13	17	130.464	
	PB- 6	18		509.248
	PB- 9	19		541.584
	PB-15	20		625.968
	PB-12	21		1,397.808
	PB- 2	22		8,036.256

Division II

	RB-2	5	884.272	
	RB-1	6	536.656	
	RC-1	7	464.592	
	RD-6	8	231.936	
	RD-3	9	55.024	
	RB-3	10		17.840
	RD-7	11		177.328
	RC-3	12		1,069.616
	RA-1	13		2,091.808

	Key	Rank	Points Credit	Points Debit
GROUP C	PC-16	7	812.864	
	PC-15	8	745.136	
	PC-13	9	687.456	
	PC-26	10	679.152	
	PC-14	11	600.848	
	PC- 4	12	572.320	
	PC- 2	13	426.192	
	PC-25	14	325.632	
	PC-10	15	286.096	
	PC-17	16	251.760	
	PC- 6	17	46.224	
	PC- 9	18		53.016
	PC-19	19		166.304
	PC- 1	20		195.536
	PC-21	21		1,486.384
	PC- 7	22		1,557.280
	PC-22	23		2,031.840
	PC-18	24		15,915.632
GROUP D	PD-12	9	698.944	
	PD- 5	10	569.264	
	PD- 7	11	560.624	
	PD-23	12	512.400	
	PD- 3	13	392.608	
	PD- 1	14	70.352	
	PD-14	15		146.832
	PD-11	16		150.464
	PD-15	17		319.936
	PD- 4	18		1,378.832
	PD-21	19		1,436.464
	PD-13	20		1,519.392
	PD-10	21		1,681.568
	PD-20	22		4,458.800
	PD- 9	23		12,716.016

Withdrawn: PC-5.
No October Report: PC-8

◆ ACCIDENTS are as costly as ever to the individual and to his employer. True, there may be fewer orders in the shop but the customer wants delivery promptly. An accident upsets planned production; it adds to costs. Likewise it adds to the distress of the individual and places an added burden on both industry and the community when resources are already taxed to relieve distress.—*The Safe Worker.*

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TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press and in the patent offices. Photostats and translations of complete articles and patents can be obtained at cost price.

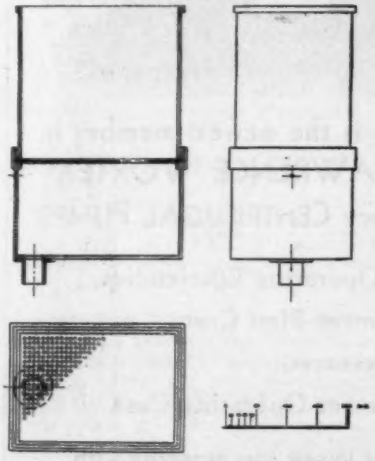
IN THE PAPER INDUSTRY ■ DOMESTIC AND FOREIGN

◆ Kaolin Suspensions

The investigation was concerned with the determination of the effect of pressure on suspensions of kaolin. Determination of the viscosity of suspensions squeezed through capillary tubes affords an idea of the distribution of the fine particles and the mechanism of hydration. It is known that vigorous agitation has a favorable influence on these properties of the kaolin suspension; hence, the idea of squeezing the suspension through capillary tubes to accomplish the same purpose is nothing essentially new but merely enhances the effect of agitation. Treating the suspensions in capillary tubes under high pressure does not make a short kaolin plastic. It is also pointed out that the kaolin used for papermaking is entirely different in properties from that used in ceramics. Dr. Rudolf Lorenz, Wochenblatt fuer Papierfabrikation, volume 63, number 23A, pages 22 to 25.

◆ Screen Analysis of Mechanical Wood

The apparatus used is shown in the accompanying illustration. Ten grams of the stock are diluted to five liters and the suspension is then tested. While in the tester, it is agitated vigorously by



means of a uniform flow of water which enters through a rubber tube. The fibers are thus strongly washed and forced through the 400-mesh screen. The mass of fibers which remain on the screen is diluted again and rewashed. The first fraction obtained is caught on an 800-mesh screen, dried and weighed. The remaining fibrous mass is removed from the 400-mesh screen, diluted with water and tested with a 256-mesh screen. The operation is repeated and a second fraction is obtained and weighed. The third fraction is obtained with 144-mesh screen, the fourth with 81-mesh screen and the fifth fraction is the remainder of the pulp. The test takes about one to two hours, depending on the nature of the mechanical wood. The apparatus is made in such manner that the screens are easily interchangeable. Experiments were also carried out on chemical pulp mixed with mechanical wood. Additional experiments on the ash content of the pulp weighted with kaolin afford interesting sidelights on the influence of the structure of the mechanical wood fiber on its capacity for retaining mineral matter. The ash content varied in the laboratory tests from 16.6 to 62.8 per cent. Dr. K. Dittrich and W. Boos, Wochenblatt fuer Papierfabrikation, 1932, volume 63, number 23A, pages 31 to 37 and number 26, pages 498 to 501.

◆ Watermarking Paper

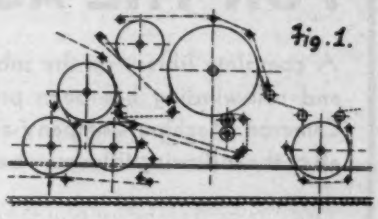
This process is concerned with the production of sharply delineated, white or colored watermarks in paper. A paper web is used consisting of two layers. The uncolored or colored paper web on the wire in the paper machine is covered with a second web which is colored differently from the first and which is as opaque as possible. This is done shortly before the paper web reaches the dandy roll for the application of the watermark. The thin, upper web contains a large amount of water and it is easily contorted or shifted corresponding to the design impressed on it by the dandy roll. This gives a very sharp watermark. I. G. Farbenindustrie A. G., Frankfurt-am-Main, Germany. German Patent No. 544,652.

◆ Half-Stuff From Wood

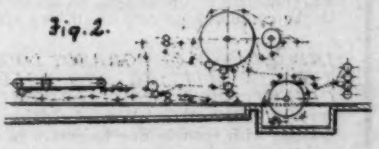
The new process is concerned with the production of half-stuff from mechanical wood, the product being light in color and usable for the manufacture of paper which has heretofore been made from chemical pulp. The light color of the half-stuff is obtained by treating the wood logs with reducing solutions. Aqueous solutions of sodium bisulphite are commonly used for this purpose. These solutions must not exceed a certain concentration, for then it becomes impossible to grind the wood. On the other hand, the concentration must be sufficient to produce the desired bleaching action without the formation of spots. It is consequently essential that the entire mass of wood is impregnated with the bisulphite liquor. This can be accomplished only if the wood has previously been freed of its entire water content. Ordinary air-dried wood cannot be used but provision must be made for drying the wood still further. Wood prepared in such fashion is extremely hygroscopic and is therefore well able to absorb the sulphite liquor. The wood is then steamed and finally ground. Carl Weisshuhn & Soehne, Troppau, Schlesien, Germany. German Patent No. 551,905.

◆ Single Glazed Paper

The single glaze must be applied to the paper web at a proper point in the dry end of the paper machine. The amount of water in the paper web is important and this depends on the kind of paper stock used, on the construction of the paper machine and last but not least on the degree of glaze required. The moisture



content must be neither too high nor too low and a mistake will not be made if the finish is applied to the paper web at a point in the machine where 70 to 75 per cent of the available drying surface has gone before and 30 to 25 per cent remains. Hence the paper web has been dried about 75 per cent at this point in the machine. A suitable moistening device must be provided. The water content of the paper web and the quantity of water added in surface moistening the paper web bear a definite ratio to each other. The cylinder, giving the glazed surface, to the paper, must be as large as possible in diameter, that is, about 2.5 to four meters. The pressure exerted by this cylinder varies according to the finish desired from 50 to 70 kilograms per square centimeter. The winding roll presses the paper web against the cylinder and is covered with felt, three to four inches thick. It is shown in Figure 1. Its life is compara-



tively short. The high temperature of the cylinder producing the finish and the pressure help to shorten its life, this in spite of cooling the felt with spray water. Figure 2 shows an arrangement

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SLITTING METHODS COMPARED deals especially with slitting methods rather than the various methods of roll-winding, as the various slitting methods have merits and demerits in themselves, independent of their relation to the combined process of slitting and roll-winding.

IMPORTANCE OF CORRECT LOCATION OF SLITTERS IN SLITTING AND ROLL-WINDING MACHINES. In this booklet the benefits to be derived from correct kind and location of slitting elements are contrasted with trouble due to errors in design of old style machines.

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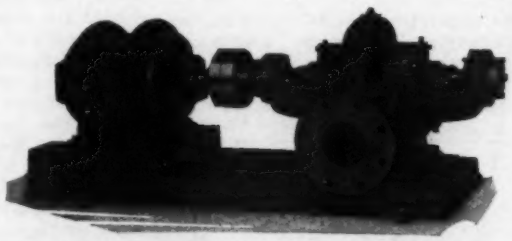

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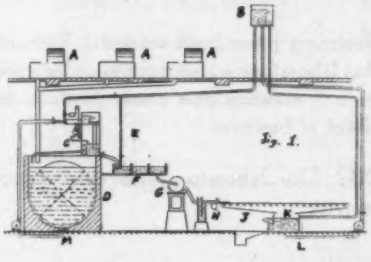
for producing single glazed paper with two press rollers. The pressure exerted by the rollers is small. The wire side of the paper will show a denser fiber structure than the top of the paper. The article discusses in detail the construction and operation of the various parts of the machine. Otto Jung Zellstoff und Papier, 1932, pages 245 to 247.

◆ Removal of Silica From Reworked Liquor

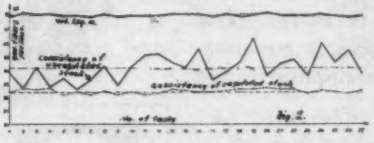
The silicic acid, which is dissolved in the liquor obtained by leaching calcined or melted crude salt from soda cellulose production, is removed by treating the liquors with carbon dioxide or with sodium bicarbonate or with both. The operation is carried out at about 15 degrees C, and is continued until the ratio of the weights of sodium carbonate to sodium bicarbonate is as close as possible to 0.44. At this point, the precipitation of the dissolved silicic acid in the form of sodium silicate is practically complete. The precipitated silica is removed by filtration and the clear solution, which contains almost no silica, is heated to recover the carbon dioxide from the bicarbonate and then causticized in the usual manner. Thus a liquor containing 24.9 grams of sodium silicate per liter (original silica 12.25 grams per liter) and 62.11 grams of sodium carbonate will contain only about 0.25 gram per liter after the above ratio has been established. Procedes Navarre, Lyon, France. Austrian Patent No. 123,852.

◆ Regulating Consistency of Stock

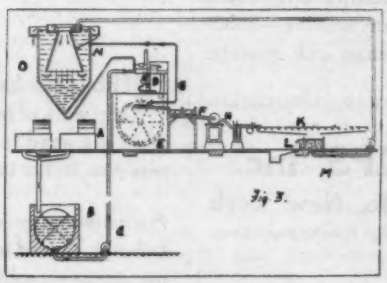
A study was made of the construction and operation of the various devices used for regulating the consistency of stock as fed to the paper machine with the purpose of determining the relation between the sensitivity of the active



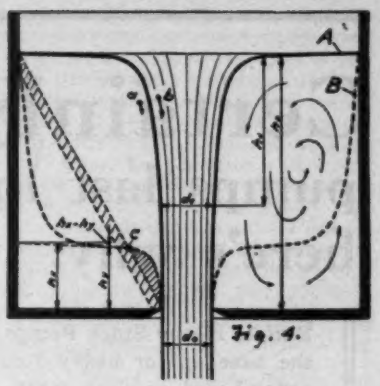
part and the degree of regulation obtained. The hydraulic conditions in the flow of the stock to the regulator and the currents within the same were investigated and the results lead to the conclusion that the form of the regulator vessel, which gives the impulse to the stock, must conform to the direction and other conditions of the flow of stock in it, if the most favorable effect is to be obtained. The continuous regulating process is discussed from all angles, including the proper use of the regulator, its location in the installation, etc. Experiments were also made on the relative variation in the consistency of the stock when regulated and when not. The curves drawn from the results show the value of the regulator in unquestionable manner. Figure 1 shows a type of regulator which is claimed to give excellent results. The pulp flows from the beaters (A) into the stuff chest (D) and from there it is pumped by the pump (M) into the regulator (C) while water, that is back-water, runs down to the same point from the back-water overflow tank (B). There is a branch line (E) from the line leading from the tank (B) for diluting water reaching the sand catcher (F) through which the pulp flows on its way through the knot catcher (G) into the flow-off device (H) on to the wire (J). The back-water is collected in (K) and is pumped from (K) by means of the back-water pump (L) into the tank (B). A series



of experiments were made with this type of regulator, the results being shown in Figure 2. Figure 3 shows an arrangement of the regulator for periodic control of the process. The pulp from the beaters (A) flows into the beater vat or mixing beater (B) from which the stock is fed by the pump (C) into the regulator (D). The stuff chest of the machine is shown at (E) and the diluting water for the stock, as con-



trolled in flow by the regulator (D) comes from the save-all (N). The regulated stock flows through the sand catcher (F), the knot catcher (H) on to the wire. The back-water from the wire collects in (L) and is pumped therefrom by the back-water pump (M) into the save-all (N). The overflow from the save-all is shown at (O). Experiments were also made on this regulator. Attention is called to the funnel-shaped form of the outlet chamber of the majority of regulators on the market. It is pointed out that this form was adopted from practical considerations only without any knowledge of the principles involved. The conditions of flow in such a chamber are shown in Figure 4. The principles involved indicate no possible improvement in the operation of the regulator through the adoption of this type of chamber. The conical shape of the vessel must impede the



proper flow of stock rather than aid it. Dead spaces are formed within the chamber and stock deposits in these places. This results in increased disturbance of the operation of the regulator. A better form of the outlet chamber of the regulator is shown by the dotted line (B) in Figure 4. The flow of stock is unimpeded and there are no eddy currents or dead spaces within the vessel. The author also points out that a knowledge of the processes involved in the flow of viscous liquids or suspensions affords a basis on which the proper design of measuring and regulating apparatus depends. E. Born. Der Papierfabrikant, 1932, pages 481 to 486, 493 to 486, 506 to 510, 520 to 522.

◆ Digesting Straw

The straw is cooked for twelve hours with 2.23 to 2.6 per cent sodium hydroxide. This is equivalent to sixteen to eighteen per cent of the weight of the air-dried straw. Digestion takes place in the cold. The straw is then drained in a false-bottomed tank and then cooked for 2.5 to three hours at 2.2 to three atmospheres pressure with superheated steam. Thereafter it is washed, pressed, disintegrated and bleached for six hours at 30 to 35 degrees C. with bleaching powder, containing three to eight per cent free chlorine. It is claimed that this method reduces the cost of production 19.4 per cent. The grade of paper obtained from straw freed from impurities compares well with writing paper made from 100 per cent bleached straw pulp and from bleached wood pulp. S. I. Khazanov and N. A. Strunnikov, Bumaschnaya Promischlennost, 1932, 47 to 51.

◆ Heating Web in Pulp Dehydrators

The theory of warm air ventilation is discussed in detail, formulae and curves being developed to afford control of the operation. A fourdrinier dehydrating machine was used with a working width of 2.17 meters and a wire length of 21 meters. There are five suction boxes. There are 50 cylinders in the dry end of the machine, which are arranged in two series one over the other. The diameter of the cylinders is 1.25 meters and the length 2.2 meters. The magnitude of drying surface is 426 square meters, that in contact with the pulp 367 square me-

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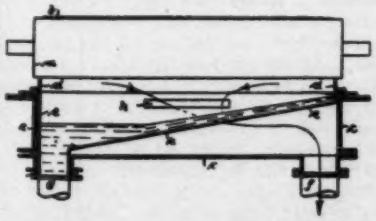
ters, which means 86.2 per cent of the total heating surface. Waste steam from back-pressure turbines or from steam accumulators is used. The average steam pressure in the main line is 0.9 atmosphere, the average steam temperature 167 degrees C., the superheat about 50 degrees C. Each drying cylinder is provided with a throttle valve. Details of the experiments are given.

Experiments on preliminary heating of the stock with warm water showed that contrary to what the literature says, a considerable increase in the throughput of the dehydrating machine is gained. The preliminary heating operation increases the temperature of the wet pulp web from 16 to 44 degrees C. The pulp web leaving the press rolls will have an absolute dry fiber content of 43.1 per cent instead of 40.5 per cent. This relieves the dry end of the machine of some of its work. The steam consumption in the dry end of the machine dropped from 1.92 to 1.65 kilograms per kilogram of absolutely dry stock. However, the thermal efficiency of the entire drying operation dropped about four per cent. This is caused by the increased difficulty of evaporation of water from the pulp web due to its higher dry fiber content. A cost analysis is given of heating the web, the extra cost of the same being compared with the gain in production. It was shown that from the thermal standpoint the use of warm water in preheating the stock is costly, for the consumption of heat involved in this process, allowing an increase of dry content in the pulp from 40.5 to 43.1 per cent absolute, amounts to about 284 kilogram-calories per kilogram of absolutely dry stock, while the heat consumption, when this effect is produced by increasing the drying action of the drying cylinders in the pulp machine, is only 140 kilogram-calories. Dr. W. Brecht and P. Haury. Wochenblatt fuer Papierfabrikation, volume 63, 1932, number 23A, pages 14 to 19; number 25, pages 483-5; number 27, pages 514 to 517.

◆ Suction Roll for Paper Machines

This invention is applicable to paper machines in which the wire passes over revolving rollers. The figure shows a longitudinal arrangement of the device. The suction trough (c) is located under



the suction roll (a) which carries the wire (b). Air-tight connection between the roll (a) and the trough (c) is secured by means of the side-pieces (d). Channels (e) open at one end are set in the suction trough (c), resting on the upper edge of the same. The air is sucked out of the suction trough (c) at one side through the outlet (f) within one of the supports of the trough. The suction water flows out of the trough through the outlet (g) through another of the supports of the trough. The inclination of the bottom of the channel (e) is accordingly from (f) to (g), and the lower end of the channel connects with the outlet (g). In order to conduct away the air, the channel contains openings (h) which are located high enough to avoid water overflowing through them. In order to avoid particles of water being carried away by the air, that portion of the wall of the channel is directed towards the suction trough. The latter which is the essential feature of the patent is free from air pressure and has no connection with the material or the form of the suction trough. Max Wenzel, Germany. German Patent No. 551,387.

◆ Preparing Paper Size

Substances, which have a solid phase within temperature limits which are attainable in practice, for example, the artificial resins or rosin, wax, paraffin, distillation residues, fats or the like, are subjected to mechanical treatment. This takes place within a temperature range between the softening point and the congealing point of the substance, and in the presence of an aqueous solution of a protective colloid, such as casein, albumen, etc. A superior size is thereby obtained. Bruno Wieger. Finnish Patent No. 13,953, filed May 14, 1930.

◆ New Process for Chemical Pulp

The author was concerned with the problem of digesting wood at a higher final cooking temperature and securing a higher yield of pulp within a shorter period of time. In order to avoid the danger of black cooking at a temperature of 160 degrees C., the wood used for digestion is treated in two stages. The first stage consists of a preliminary impregnation of the wood with organic acids and salts. This aids in the regulation of the hydrogen ion content. The second stage is then ordinary digestion. The preliminary impregnation of the wood is accomplished with the aid of gas or air pressure of five to eight atmospheres at or over the boiling temperature. It lasts about three hours before the actual digestion sets in. The digestion period lasts five hours in small digesters, seven hours in average size digesters and nine hours in very large apparatus. The admittance and discharge of the impregnating liquor takes about forty minutes. The starting temperature in the digestion proper is about 70 degrees C. This process shortens the time of direct digestion by about two to three hours, and of indirect digestion about three to five hours. The sulphate digestion process is also favorably affected in the same manner. A maximum temperature of 190 to 200 degrees C. can be maintained without impairing the quality of the stock. The time of digestion can be shortened by about four to five hours. Pulp with a tearing length of 8125 meters is obtained in the acid digestion process. The Tingle coefficient is 6.5 and the alpha-cellulose content of the unbleached pulp is 92.02 per cent. These results were obtained both in experimental as well as large scale cookers. The economy of the new process is considerable as compared with ordinary digestion. Digestion may be carried out with or without circulation of the liquor (Morterrud process). The author believes that the process can be economically and successfully used in the United States. Yrjo Kylander, Papp. och. Traevaru-tidskrift, foer Finland, volume 13, 988ff.

◆ Rosin Difficulties

The action of air bubbles during the sizing of pulp with rosin in the beater is studied. The bubbles carry along particles of fat and oil as well as rosin and when the bubbles finally burst on the surface of the pulp mass, the oil and fat particles remain behind and ball together. Large aggregations are finally formed and contaminate the pulp. Tests

have shown that there is a proper and improper method of introducing the pulp mixture into the trough of the beater. This is shown in the accompanying illustration. Figure I shows the wrong method. The stock, poured in at the top, carries along with it a large number of bubbles. The correct method is indicated in Figure II. The stock is introduced at the bottom and flows up to the top. A conical-shaped box is shown in Figure IIa. The effect of backwater in causing rosin spots is also discussed. The author also calls attention to the formation of brown balls of rosin about pea-sized in an agitator-tank containing unbleached pulp. This took place suddenly in summer with a water temperature of about 24 degrees C. The arms of the agitator were covered with a thick, brownish, resinous mass. When the arms of the agitator emerged from the stock mixture, the stock collected at the ends of the same and formed into small balls as the water dripped off. These balls of stock remain unchanged in the bleaching beater and hence reach the machine. The formation of deposits on the agitator arms apparently cannot be avoided under existing conditions. The only thing to do is to clean the arms thoroughly. The rosin precipitates only on the iron parts of the agitator and only when the temperature of the water is unusually high. Otto Brune. Wochenblatt fuer Papierfabrikation, 1932, volume 63, pages 550 to 552.

◆ Sizing Whole Stuff

In sizing whole stuff with rosin, the precipitating agent, which is used at the end of the sizing process, that is aluminum sulphate, or the like, is mixed with

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reducing agents. Compounds of bivalent or tetravalent sulphur are used for this purpose.. The addition of these reducing agents makes the whole stuff more or less acid in reaction. This condition is required for the double decomposition that takes place between the reducing agents and the oxidizing substances. This refers particularly to nitric acid. The new way of sizing whole stuff has for its principle advantage the uniformity of the sizing process under all conditions. The particles of whole stuff are never de-sized during the process or thereafter, a phenomenon which has given considerable trouble in the past. Dr. Otto C. Strecker, Darmstadt, Germany. German Patent No. 546,883.

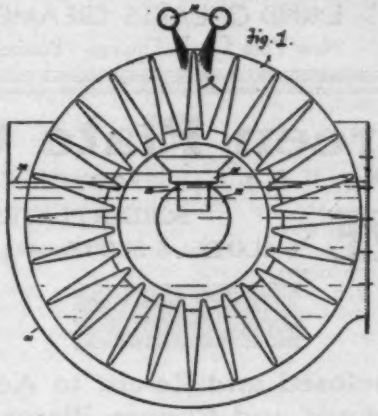
◆ Kinetics of Sulphite Digestion

The purpose of digestion is to remove the lignin of the wood whether or not this may be chemically combined therein. The first stage is sulphonation of the lignin and then the ligno-sulphonic acids, which are not decomposed at comparatively high temperature by dilute acids or bases, are subjected to hydrolysis with the formation of a soluble lignin compound. As long as available calcium sulphite is present in the liquor, digestion is normal. When the lime is combined with a stronger acid, for example, ligno-sulphonic acid or sulphuric acid, the acidity of the digestion liquor rises rapidly and the color of the liquor changes from yellow to brown. This color change is due to the fact that the ligno-sulphonic acid is converted into an irreversible form due to the higher acidity of the digestion liquor. If the acidity increases still further and polymerization of the ligno-sulphonic acid takes place, the digestion is reversed. A black cook is obtained. The speed of the reaction between sulphurous acid and lime and the incrustated substances on the wood depends on the concentration of HSO_3 ions, on the pressure and temperature.

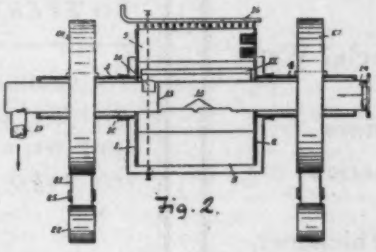
Micro-digestion experiments have shown that the dissolution of the incrustating material in the wood is a reaction of the first order. Its degree can be calculated by formula. It is the speed of solution of the sulphonated lignin compounds, that is hydrolysis, that determines the over-all speed of the digestion process. The speed of reaction is doubled for every ten degrees C. rise in temperature. The experiments were carried out in a digester of two cubic meters capacity. The temperature coefficient for the diffusion process amounts to 1.2 for every ten degrees C. increase of temperature. It has also been found to be higher, namely, 2.0. When the circulation of the liquor is effective, the size of the chips is of little significance. Experiments have also shown that the dissolution of the incrustating materials can be calculated, after the reaction constants have first been established for the chips and digestion liquor used at constant temperature. Formulae are developed. The results agree well with actual experimental figures. Water and hydrogen ions are the essential factors in hydrolysis of ligno-sulphonic acids. The hydrogen ions are apparently not consumed during hydrolysis, while the water, which is present in large excess, is consumed. Dr. A. St. Klein. Zellstoff und Papier, 1932, pages 233 to 234.

◆ Refining Engine

The apparatus is shown in Figure 1. The essential part is a rotating drum (1, 2) resting on shafts (3) and (4). A number of rectangular, grooved plates (5) are located between the side pieces (1) and (2). These plates are seen to



better advantage in Figure 2, and are arranged in the form of a star around the drum. The plates are tied together at their outer ends. The construction of the drum is more economical and it is easier to handle. The shafts (3) and (4) are hollow. Tubes extend therein for feeding the pulp to be purified, the inlet being shown at (14). The perforated plates (5) which become filled with refuse are cleaned by means of a



current of water from the jets (16). The arrangement of plates also makes for a large available surface for purification. The manner of rotating the apparatus is shown in Figure 2, the pulleys (20) being connected with the pulleys (22). This is a belt drive. Societe E. et M. Lamort Fils, France. French Patent No. 733,436.

◆ Making Thick Paper Webs

The web, that is formed on a cylinder wire under the action of suction, is removed from the wire and fed to another part of the cylinder wire, after it has first been advisably diluted. Then the final thickness of web is formed. The cylinder is surrounded by two stock troughs or vats, which are separate from one another. A part of the surface of the cylinder wire, which is located between those parts of the surface, on which the web forms by the action of suction on the fibers drawn from the stock tanks, is not under suction so that at this point two separate paper webs can be removed from the cylinder wire. Harald Jensen, Oslo, Norway. Finnish Patent No. 13,459.

◆ Speed of Paper Machines

The author points out that the output of paper machines of same width and same construction in all details will vary sometimes as much as 200 per cent. He assigns this to the speed of operation of the machine. He outlines means for increasing such speed. Among the suggestions made are blowing in hot air in the dry end of the machine, proper selection of the quality of the drying felt, etc. In regard to the latter, it is not correct to use one and the same quality of felt for all the drying cylinders. The first, lower series of cylinders require a lighter felt. The first, upper series of cylinder will operate better without a felt, or at least the first upper cylinder. The remainder require a heavier felt. The number of drying cylinders to a single felt also receives consideration. This is unimportant as long as the felt leaves dry at the last cylinder in the series. The use of fresh steam at five atmospheres pressure in the felt drier to effect complete drying of the felt was found to increase the production about twelve per cent. No trouble is experienced with the sizing action of the drying cylinders when the speed of the machine is properly adjusted to the drying action of the cylinders. When all the cylinders are equally loaded from one end to the other of the machine, there is no trouble with the sizing quality of the paper. Trouble is encountered only when the paper web is pressed tightly against the fully heated cylinder as in the manufacture of paper single calendered paper. Reifergerste. Wochenblatt fuer Papierfabrikation, 1932, pages 549 to 550.

◆ Kraft Paper

A kraft paper, whose tearing length value across the width of the web is about 50 per cent of that in the length, generally possesses maximum average tearing length. Paper, which is prepared from the same stock on a special paper machine and which has the same tearing length both in the width and the length, has an average tearing length or bursting strength value about ten to fifteen per cent less than in the first case. There are three grades of kraft paper according to strength: first grade corresponding to average kraft paper tearing length 6500 to 7500 meters; second grade or strong kraft paper 7500 to 8500 meters; third grade or extra strong kraft paper 8500 to 11,000 meters. Paper under 6000 meters tearing length cannot be considered as kraft paper. H. Honauer. Papp. och Traevarutidskr. foer Finland, volume 14, page 33.

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The COMMERCIAL OUTLOOK

New York, December 1, 1932.

WITH the foreign debt situation hanging over general business and having a very deterrent influence, with commodities and securities again exhibiting pronounced easiness under the dull market conditions prevailing, and with seasonal slackness noted in most manufacturing industries and in wholesale business generally, the paper industry is not as active as it was a few weeks ago and it is very evident that demand for a majority of grades of paper is tending toward contraction. As regards the paper industry specifically, there is no doubt the showing down of business recently has been largely seasonal. It is nothing unusual as the year draws to a close for consumers and converters to let down in their purchasing pending the placing of contracts for the new year, or is it naught else but customary for paper manufacturers and merchants to slow up their operations while bent on reducing inventories for the stock-taking period. The general situation has doubtless accentuated this seasonal condition, and in contrast to the position of only a short while ago, the paper market is decidedly quieter.

Reports from various manufacturing centers tell of paper mills curtailing their operating schedules as a result of the smaller volume of orders coming in, and in preparation for year-end inventories. Nevertheless a feeling of optimism and confidence is expressed all through the industry. The election is now a matter of history; the immediate situation brought about in good part by the unfortunate war debt dilemma is expected to be terminated favorably in the near future or when Congress gets to functioning again; retail trade during the pre-holiday period promises to measure up comparatively well and effect the removal of a large volume of merchandise into consuming channels, while the advent of a new year is anticipated to give renewed hope and assurance of better times and lead to improved business conditions. All of which should be reflected in the paper market by a broader demand for the various classes of paper and result early in 1933 in a revival of the upward surge registered in paper business during the early autumn.

Meanwhile demand for paper is not by any means dormant. There is a steady call of moderate dimensions from numerous consuming and converting quarters, and not only are buyers absorbing fair amounts against current requirements, but new contracts are being arranged for supplies for next year. It is said, in fact, that consumers are contracting quite freely for 1933 commitments; in many instances signifying confidence in the present level of paper prices while feeling future developments will prove no mistake was made in buying freely at prevailing market quotations. Moreover, most paper and board mills have enjoyed several months of vastly improved business; demand in many cases increased to lengths hardly expected by manufacturers and necessitated the speeding up of production operations to the highest pitch of the year, so that mills now are better enabled to stand a period of seasonal quietness such as is invariably experienced at the end of the year.

All the statistics as yet available are impressive of the sharp rise in paper production during the past several months as compared with the summer period. Newsprint output in the United States and Canada during October reached a total of 234,237 net tons, contrasted with 221,312 tons produced in the preceding month, according to the News Print Service Bureau. Shipments from mills in October amounted to 234,490 tons, against 225,867 tons in September, the October shipments exceeding slightly the production in that month. United States output was 76,731 tons and shipments 76,922 tons in October, compared with 70,621 tons produced and 73,234 tons shipped in the preceding month, while Canadian mills made 157,506 tons and shipped 157,568 tons, against 150,691 tons and 152,633 tons, respectively, in September. During October, 20,641 tons of newsprint were made in Newfoundland and 1,198 tons in Mexico, so that the total North American output for the month amounted to 256,076 tons, against 243,896 tons in September. The Canadian mills produced 267,802 tons less in the first ten months of 1932 than in the same period of 1931, which was a decrease of 14 per cent. The output in the United States was 122,601 tons or 13 per cent less, in Newfoundland 17,577 tons or 7 per cent less, and in Mexico 2,208 tons less, making a North American decrease of 410,188 tons or 13 per cent. Stocks of newsprint at Canadian mills at the end of October totaled 48,411 tons, and at United States mills 32,790 tons, giving a combined total of 81,201 tons, compared with 81,454 tons on September 30.

Production of paperboard scored a good gain in September, rising to a total of 181,545 tons from 173,805 tons produced in the preceding month and 162,214 tons in July last, according to the monthly summary of the board industry compiled by the U. S. Department of Commerce. The September output brought the aggregate board production for the first nine months of this year up to 1,614,941 tons, contrasted with 1,988,379 tons in the corresponding time of 1931, and 2,065,842 tons in 1930. New orders received by board manufacturers during September called for 205,568 tons, against 182,701 tons in the preceding month, while unfilled orders at the end of September were for 51,989 tons, contrasted with 35,864 tons a month before. Shipments of board from mills in September totaled 189,230 tons, comparing with 171,486 tons in August, and stocks on hand at mills at the end of September were 74,237 tons, against 81,805 tons at the end of August.

Newsprint manufacturers on the Pacific Coast have followed the lead of eastern and Canadian mills in reducing prices and the contract basis in the far West has been lowered $5 a ton to $45 f.o.b. Pacific Coast ports, effective January 1. The Pacific manufacturers are guaranteeing contract purchasers against a price increase above $48.50 for 1934 and above $52.50 for 1935. This price reduction at Pacific Coast ports brings consumers in that section on an exact parity with New York and Chicago, the eastern and Canadian manufacturers having late in September cut $7 a ton from the price of newsprint to important United States points, breaking the quotation of $52 that had been in force since the beginning of the year.

A favorable development in the price situation has been the further advancement in box board quotations, eastern mills having increased prices to $30 per ton delivered in New York City on news board and $27.50 on plain chip board. Only a few months ago these boards were selling in the East down around $20 and $22.50 a ton, so that prevailing prices constitute a substantial rise in the market's levels. Otherwise, paper prices are rather unsettled, and, if anything, in a comparatively unsteady position. Southern kraft wrapping is reported selling at 2.25 cents a pound, and northern kraft at 2.50 cents—prices which are the subject of much complaint on the part of paper manufacturers who, however, seem to be doing little or nothing about it. Book paper values are easy, with reports of purchases of white machine finish book in rolls at 3 cents a pound and coated book paper in carloads at as low as 5 cents delivered. Fine paper manufacturers are striving to uphold quotations on their product, more particularly the high grades of rag content and in the face of a relatively narrow demand from consuming sources. Tissue papers, on the other hand, are quotably easy. Demand for building papers is reported to have slumped.

❖ ❖ ❖

◆ LINK-BELT COMPANY, Chicago, has appointed George M. Sharer as sales manager of its eastern division, with headquarters in Philadelphia. Mr. Sharer has been connected with the company in Philadelphia for the past 32 years. In his new capacity, he will have direct supervision of sales of all the company's offices in the Atlantic Coast States.

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Domestic RAW MATERIALS

◆ Papermaking Rags

As usually is the case as the end of the year draws on, the market for papermaking rags has quieted, and the condition now is dull indeed. There are some transactions going through but they are chiefly of routine character, are only occasional in their development, seldom involve other than limited quantities of rags, and fail to have influence of a perceptible nature on the price situation. Not only are the better grades of rags used principally by writing paper mills in slow demand, but the bulky stocks, such as roofing rags, are in less call than a few weeks ago. It would seem that the customary seasonal quietness witnessed at this time or prior to the holiday and inventory period is having its full effect on the market notwithstanding that rags for papermaking already were in a quiet position before the present accentuated dullness set in.

About the only factor having visible bullish aspect is the supply condition. There is no doubt that available stocks of papermaking rags, of nearly every grade and description, are small. Various reasons are responsible for this; first, the production and collection of rags has fallen off substantially; second, there are fewer dealers and collectors operating, so that a good portion of the old and new rags that may be obtainable are not being gathered, sorted and made ready for mill consumption; third, the financial condition of most concerns in the rag trade is such as to materially reduce the quantities of rags dealers are carrying in their packing plants and warehouses, and fourth, the market values of most rags is and has been so low that packers have sorted fewer grades, throwing a bigger percentage into roofing stock and thereby reducing the volume of output of most other grades. Nevertheless, paper manufacturers are experiencing no difficulty covering their restricted requirements, and are, if anything, finding more rags available than they have need of under present mill schedules. On the other hand, let consuming conditions change for the better and paper mills come into the market for larger supplies of rags, and an entirely different situation unquestionably would quickly develop.

A proportionately better demand exists for new cuttings than for old rags; it is evident that many fine paper mills are utilizing new rags only in their present operations—the explanation apparently being that new cuttings are so cheap that manufacturers are using such rags to the exclusion of old material. Most dealers ask 4 to 4.25 cents a pound f.o.b. points of shipment for No. 1 new white shirt cuttings, while new unbleached muslins are quoted at 4.75 cents at shipping points, new light silesias at 3.50 cents, new blue overall cuttings at 3.25 cents, fancy shirt cuttings at 1.25 to 1.50 cents, washables at 1.25 cents, and new light flannelettes at 3.25 cents. Old white cottons are available at 2.50 to 2.75 cents a pound at shipping points for No. 1 repacked, and 1.50 to 1.75 cents for No. 2 repacked, while thirds and blues of repacked quality are to be had at 85 to 90 cents per hundred pounds and perhaps at slightly less, and twos and blues at around 1.00 cent a pound. Price levels on roofing stock have eased slightly to 45-50 cents per hundred pounds for No. 1 classification packing and an average of 40 cents for No. 2 roofing f.o.b. dealers' points. With felt mill operations having been curtailed, demand for roofing rags has slowed down, and most buying by manufacturers currently is said to be against expected requirements in the new year.

◆ Rope and Bagging

Dealers and importers agree that it is no easy task to accomplish sales of old rope to paper manufacturers. Most rope paper mills evidently have fair-sized stocks of old rope and are not much inclined to add to their supplies, almost irrespective of price. There is a routine movement of rope but the volume is light and mills are meeting prices which it would appear they themselves have maintained in the face of the market's dullness. Domestic old manila rope of No. 1 grade is selling at 1.40 to 1.50 cents a pound at shipping points, and No. 1 foreign old manila at about 1.35 cents ex dock New York and other U. S. Atlantic ports. Strings of all grades are in little demand and uncertain in price. Bagging is wanted only in spasmodic fashion, indicating papermakers are buying when in actual need of supplies and not otherwise.

◆ Old Paper

Of all papermaking materials, waste paper has enjoyed perhaps the best market in recent weeks. Demand from board and paper mills assumed fairly broad dimensions during October and November; offered supplies were well absorbed, and market prices moved up appreciably on a majority of grades with something of a tight supply condition registered for a time. However, the market has now quieted as it ordinarily does toward the close of the year, and while prices have shown but slight changes, the trend is downward and buyers are succeeding in getting most of the supply wanted at present at a little below the top market levels reached recently.

◆ Pulpwood

Exports of pulpwood from Canada in October amounted to 56,463 cords, valued at $558,075, all to the United States, compared with 74,448 cords of a value of $738,979 in the preceding month, and 96,780 cords of a value of $968,285 in October, 1931. Demand for pulpwood is fair and prices are holding to about stationary levels.

◆ Mechanical Pulp

A fairly steady demand of moderate dimensions is reported for mechanical pulp. Consumers in quite a few cases have been obliged by water conditions, increased requirements or other circumstances to enter the market for supplies, and the aggregate tonnage of pulp bought has been fairly large. Prices exhibit a steadier tone than was the case several months ago, with Canadian grinders asking and securing $15 per ton for prime groundwood f.o.b. pulp mills and with some sales reported at $1 a ton on either side of this level, depending on the haul to consuming centers. Domestic groundwood is on a quotable basis of around $18 at grinding plants though few domestic producers have much pulp for sale. Board mills as well as paper manufacturers have purchased mechanical pulp on a larger scale of late, and the general expansion of demand has been creative of an improved market condition.

◆ Chemical Pulp

The movement of chemical wood pulp of domestic manufacture is mainly of routine character. Those consumers obtaining the bulk of their supplies through contract arrangements are absorbing shipments from producing mills in a steady manner, and in the aggregate are apparently taking a fair tonnage of pulp, whereas open-market demand is of narrow proportions having scant influence on the situation. Prices have recorded few changes of consequence. Domestic bleached soda pulp has been reduced another $5 a ton to 2 cents per pound delivered paper mills, but sulphite prices adhere to previous levels and no revisions of definite character have occurred in kraft pulp quotations. West Coast and other producers of prime bleached sulphite are asking 2.10 cents a pound ex dock Atlantic seaboard for such pulp and are holding firm for this price, while domestic unbleached sulphite ranges in price from 1.50 to 1.75 cents a pound f.o.b. pulp mills, depending on quality and the freight to consuming points. Kraft pulp prices are on a broad scale of 1.50 to 2 cents a pound at producing mills.

◆ Chemicals

Contract shipments comprise the main activity in papermaking chemicals, and most consumers are holding off buying pending the negotiation of contracts for next year's supplies. Quoted prices are generally maintained. The contract basis on soda ash for 1933 show an advance of $1 per ton to 1.05 cents in bulk, 1.30 cents in bags and 1.43 cents in barrels f.o.b. works. Caustic soda quotations also are up $1 a ton to 2.55-2.60 cents a pound for the solid product at works.

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PAPER

Import and Export MARKETS

IMPORTS

◆ Wood Pulp

With the paper industry having experienced some little upturn in activity in recent months, manufacturers have displayed greater interest in offerings of wood pulp and have bought with increased freedom, principally for forward shipment from primary sources abroad. Most of the contracts placed have involved supplies for 1933, yet some fair-sized commitments have been made as well calling for current shipment from Europe, and the market as a whole has taken on a livelier atmosphere. While there is no doubt the statistics for the year, when completely available, will show a reduction in importations of wood pulp into the United States during 1932 as contrasted to recent previous years, it seems probable that the business for the year—taken as a whole—will total favorably in comparison with numerous other imported commodities.

Paper manufacturers apparently have come to a conclusion that pulp prices are low, or at least are about as low as they can be expected to go, and contracts are being placed freely whenever the need of supplies becomes felt, even potentially, more particularly when pulp is found available at prices a trifle under those recognized as representing prevailing market levels. Producers abroad are putting much stress on the unprofitable prices obtaining on pulps, and are insisting that the market cannot remain so low once world consuming conditions register improvement. Such advices from primary sources, coupled with the fact that European producers are adhering firmly to the prices quoted and are in some instances exerting every effort to get a little higher for their pulps, appear to be instilling confidence in consumers in the United States to the degree where they are making purchases on a bigger scale. Reports say that buying for shipment from abroad next year has been fairly heavy, and judging from the tonnages arriving at the various Atlantic ports recently, paper manufacturers have been fairly largely committed on shipments during the final quarter of 1932.

Latest issued statistics show that imports of chemical pulp into the United States in September amounted to 70,351 long tons, registering an increase over the preceding month's importations and constituting the largest month's imports since March last. The September imports were valued at $2,689,919, and compared with 65,822 long tons of a value of $2,574,430 in August, and 107,480 long tons of a declared value of $4,776,006 in September, 1931. The September imports brought the total for the first nine months of this year up to 780,400 long tons, giving a monthly average of 86,711 tons, contrasted with a total of 881,390 tons or a monthly average of 97,932 tons during the corresponding period of 1931. Mechanical pulp imports in September were 15,658 long tons, valued at $295,539, against 8,034 tons of a value of $145,099 in the preceding month and 16,665 tons of a value of $375,843 in the same month last year, making a total for the first nine months this year of 114,179 long tons of a declared value of $2,304,651, compared with 129,456 long tons of a value of $3,248,750 in the corresponding time last year.

Very little change is noted in prices of imported pulps. Bleached sulphite of prime grade is firm at 2.10 cents basis ex dock New York and other American Atlantic ports, with talk in the trade of efforts to push this price up to 2.20 cents though on the other hand with some bleached sulphite said to be available at slightly under 2.10 cents or down to about 2 cents. Prime strong unbleached sulphite is quoted at 1.60 cents, and kraft pulp at 1.50 cents for the standard mill brands ex dock Atlantic seaboard. These prices are being shaded in some instances, purchases of strong sulphite at 1.50 cents and of kraft down to 1.35 cents having been reported. Scandinavian groundwood has firmed up slightly in price to where importers and agents are quoting $17 to $18 per short ton ex dock for dry and $16 to $17 for moist mechanical pulp for shipment from abroad.

◆ Paper Stock

Imports of rags for papermaking into the United States remain on a small scale, far below anything which might be designated as normal over recent years. September receipts amounted to 4,225,980 pounds, valued at $63,617, bringing the total for the first nine months of the current year up to 62,215,283 pounds of a value of $839,374, contrasted with 92,761,331 pounds having a declared value of $1,261,068 in the similar period of 1931, according to U. S. Department of Commerce figures. Miscellaneous paper stock imports in September were 8,951,460 pounds, valued at $82,366, making a total for the first nine months of 1932 of 69,077,449 pounds of a value of $610,900, against 81,652,674 pounds of a value of $1,183,793 in the same time last year.

◆ Paper

Imports of paper and paper products into the United States in September reached a value of $6,996,141, according to official government statistics, representing decreases of 10 per cent and 25 per cent, respectively, from the preceding month and the corresponding month last year, the August, 1932, receipts being valued at $7,847,484, and in September, 1931, at $9,423,384. Newsprint imports were valued at $6,322,677, or 10 per cent below the preceding month and 25 per cent under the September, 1931, imports. Imports of cigarette paper, on the other hand, valued at $280,378 in September showed an increase of 33 per cent over the similar month last year and a 7 per cent rise over August this year. Increases over the preceding month also were registered in imports of wrapping paper, pulpboard, testboard and wallboard, paperboard, cardboard and hanging paper.

EXPORTS

The month of September witnessed a further decline in exports of paper and paper products from the United States, according to the latest statistics issued by the U. S. Department of Commerce covering that month. The September exports totaled in value $1,118,852, contrasted with $1,168,649 in the preceding month and $1,683,730 in the corresponding month of 1931, making an aggregate for the first nine months of the current year of $12,024,460, compared with shipments valued at $17,373,327 in the similar time last year.

Wallpaper exports in September more than trebled the extremely low figure of August, but showed a decrease of 56 per cent from September, 1931. Other increases over August were as follows: Coated papers, 60 per cent; bristols and bristol board, and sheathing and building papers, each 30 per cent; toilet paper, 27 per cent; overissue and old newspapers, 18 per cent, and paper towels and napkins and fiber insulating lath or board, each approximately 15 per cent, while slight increases occurred in miscellaneous paperboard, blotting paper, paper bags, boxes and cartons and envelopes.

Boxboard suffered the heaviest decrease, amounting to only $25,756 in September, or less than half of the value of the August exports. Other significant losses compared with August figures were as follows: Cash register and adding machine paper, 40 per cent; filing folders, index cards and other office forms, 35 per cent; book paper, 30 per cent; newsprint, greaseproof and waterproof papers and fancy writing paper, each approximately 25 per cent; wrapping paper, vulcanized fiber sheets, strips, rods and tubes, and tissue and

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Newton D. Baker

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September exports of paper base stocks were valued at $197,617, representing a 35 per cent decline compared with the same month a year ago, but an increase of $78,658 over August this year.

◆ ◆ ◆

◆ Automatic Compensator for Bag Machines

The engineering staff of the Smith & Winchester Manufacturing Co., South Windham, Conn., working with the research division of the General Electric Co., has perfected, within the past year, a patented automatic compensator for its paper bag machines.

It is claimed this patented device, utilizing the electric-eye, makes it possible to print rolls of paper on two or three color rotary presses, rewind, send them through the bag machines, and save the extra handling of the tubes. Length of tubes do not vary and higher speeds are consistently maintained. Speeds of 500 feet of paper per minute are easily handled.

The combination of electric-eye and compensator in connection with a cut-off control has been developed only after long and extensive study and experiment. This machine is being used today on the tubes used for valve bags, and the developments are being worked out for other size machines at the present time.

◆ New Bale Pulper

The Paper & Industrial Appliances, Inc., No. 122 East 42nd Street, New York City, has been appointed sales agent for the new Bale Pulper built by the Sturtevant Mill Company. This pulper is said to take complete bales of dry pulp with or without the wrappers and to deliver them completely as defiberized stock to the beaters at a uniform consistency with a consuming, little horsepower.

The action of this machine on the dry sheets, which are saturated during the defiberizing process, is on the brushing principle and not that of shredding.

The degree of desired defiberation is accomplished through a patented extractor feature, which, in addition to being very effective on kraft pulp, has also proved its value on bleached and unbleached sulphite.

It is further understood that the feed and milling action of this machine is entirely new and that installations have already been made.

◆ A LEADING SWEDISH wood pulp mill has recently undertaken a method for the bleaching of sulphate pulp by a new electrolytic process. This new method aims at bleaching sulphate pulp at a comparatively low cost without reducing the fiber strength of the pulp. If successful, it will be possible to produce a kraft paper which is white, clean and odorless, and at the same time much stronger than sulphite paper.

Chemipulp Process

The CHEMIPULP Hot SO_2 Gas and Liquor Recovery System combined with a novel digester circulating system gives complete control of sulphite digester operation.

CHEMIPULP Hot Acid Recovery and Cooking gives uniform penetration before reaction temperatures are reached, and the positive circulating system maintains an equal distribution of the heat units, two factors that are of prime importance for uniform, high quality pulp.

In addition to the benefits in improved pulp quality given above, the CHEMIPULP PROCESS saves steam, sulphur and limestone and increases yield and capacity of your sulphite mill.

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Heavy stem threads are protected from corrosion by a bronze bushing cast in the bonnet. Rolled-in bronze seat rings cannot loosen in service. Disc-stem connection is strengthened by its horseshoe band construction.

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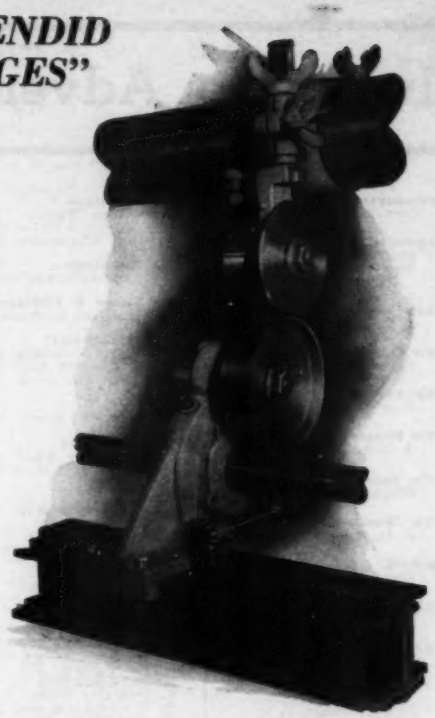

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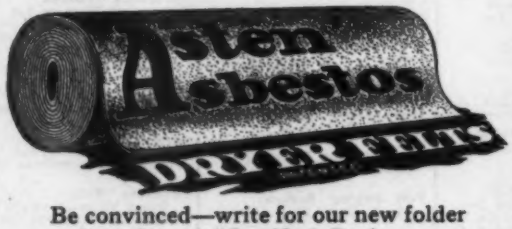

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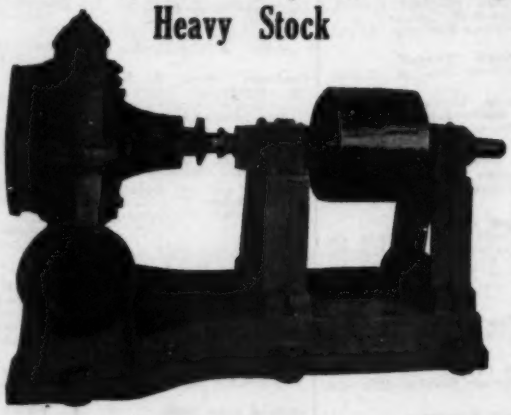

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Hudson-Sharp Mach. Co.

Towel (Interfolding Machine)
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Moore & White Co.

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Marion Malleable Iron Wks.

Turbine (Steam)
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Westinghouse Electric & Mfg. Co.

Turbines (Hydraulic)
Holyoke Machine Co.

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The Lunkenheimer Co.

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B. F. Goodrich Rub. Co

Valve Specialties
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Wm. Powell Co.

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Lunkenheimer Co., The
Wm. Powell Co.
Trimbey Machine Wks.

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General Electric Co.
The Lunkenheimer Co.

Valves (Gate)
The Lunkenheimer Co.
Wm. Powell Co.

Valves (Non-return; Emergency Stop)
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Wm. Powell Co.

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Wm. Powell Co.

Valves (Relief)
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Wm. Powell Co.

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Ventilating Fans
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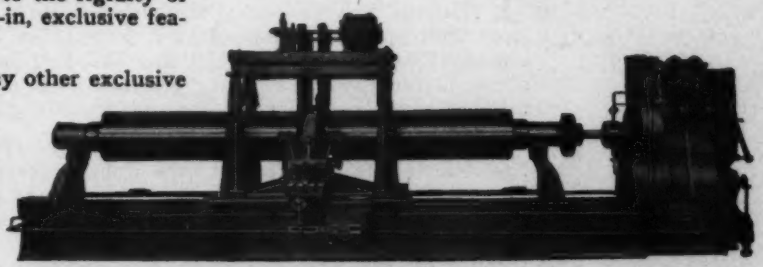

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¶ If you are one of these executives, a copy of the 1932 edition should be immediately available to you. Become better acquainted with it.

¶ Learn the many ways in which it will work for you.

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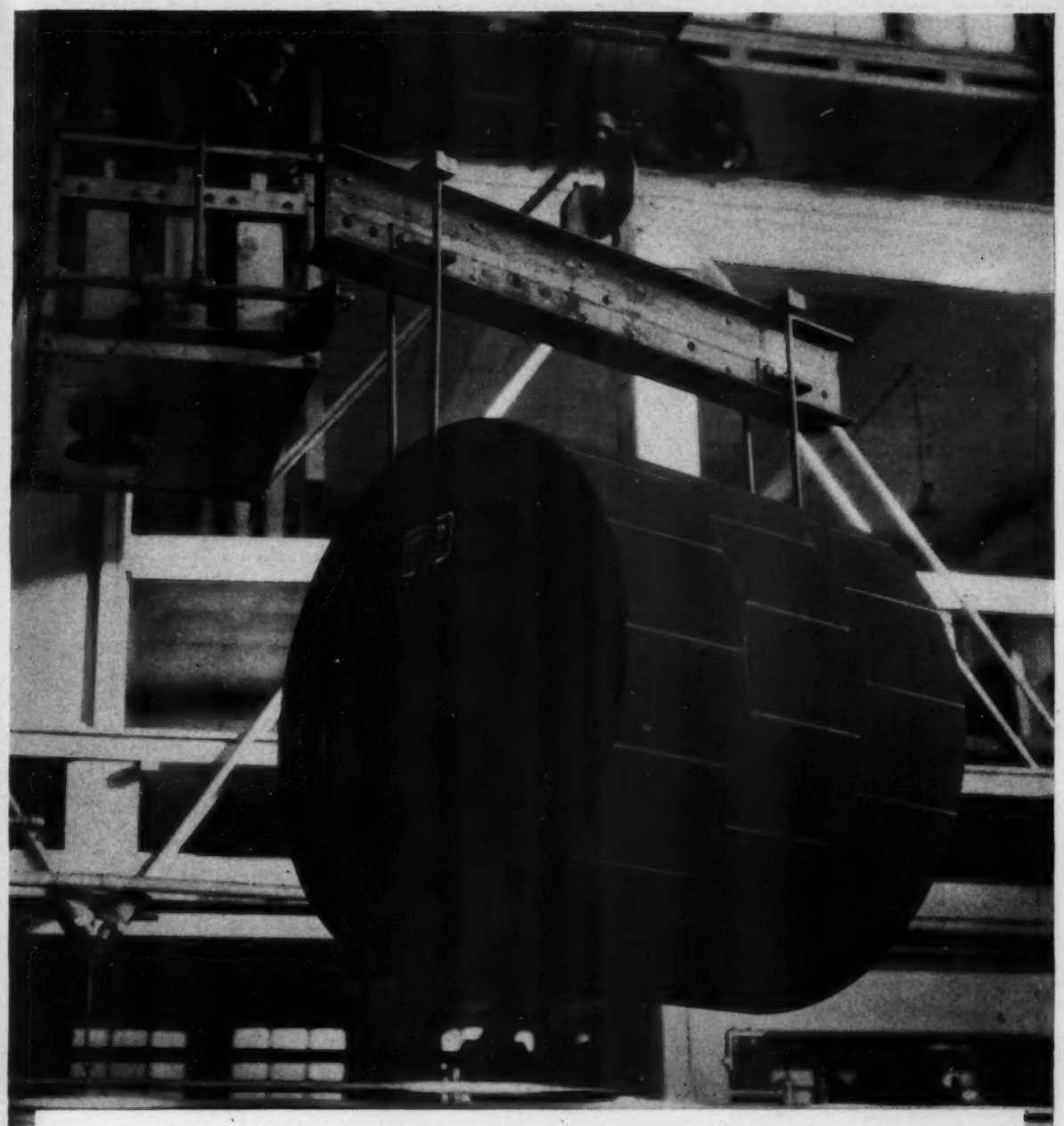

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to Users of Sulphite Pulp

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